# ELECTRICAL WEST

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THE JOURNAL OF ELECTRICITY

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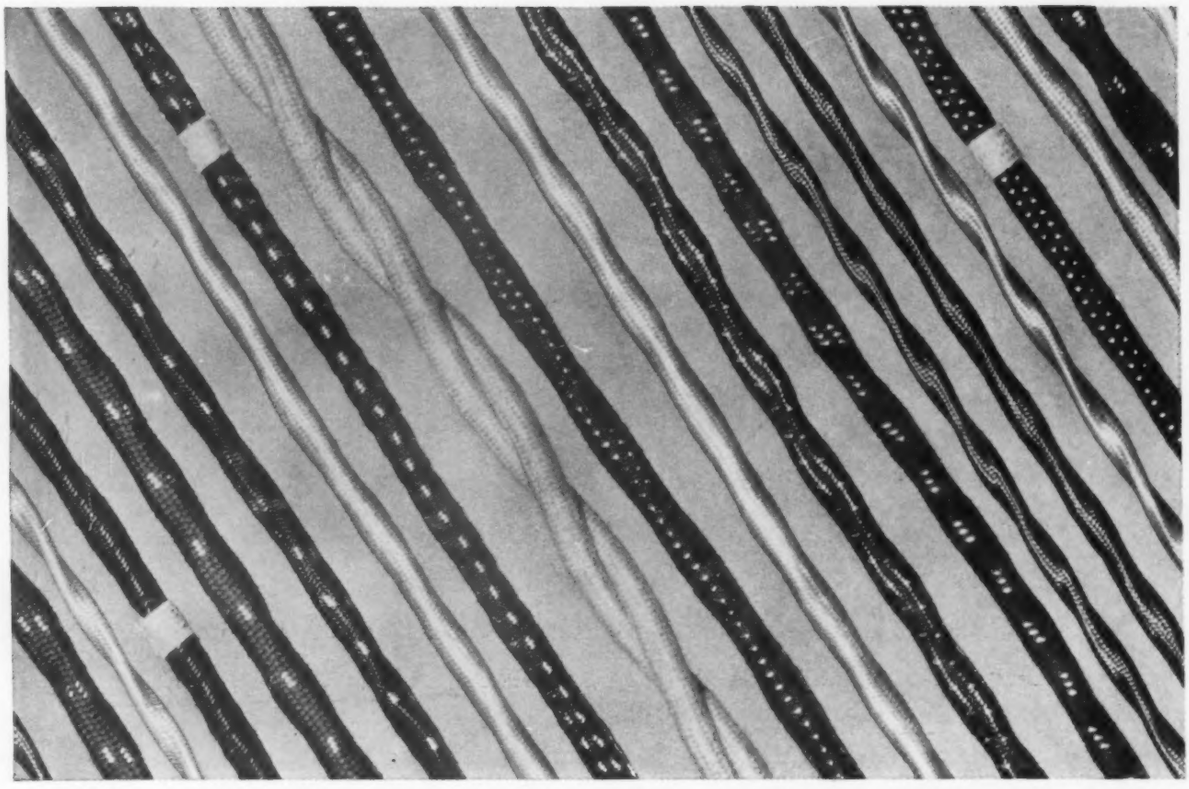

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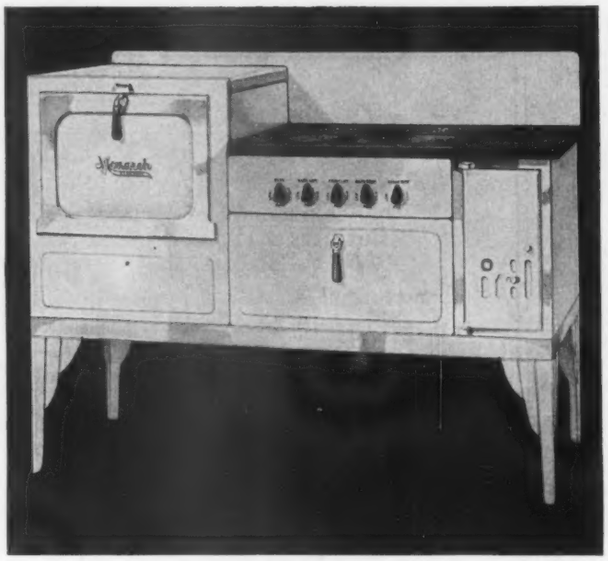
# MONARCH

## *Ranges that combine* COLORFUL BEAUTY... *Important new features and* ATTRACTIVE PRICE

HERE are but three of the many models that make Monarch the most complete electric range line. Send for the catalog showing the full line with new low prices.



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***An Outstanding Quality Model with built-in Kitchen Heater at a most attractive price***

**Model H17F,** 17-inch enamel lined oven. 4 surface units. Built-in firebox suitable for coal or wood. Regularly equipped with new type automatic temperature control with illuminated dial which eliminates relay. Roomy utility drawer. Marbleized top of stain-proof porcelain. All porcelain enamel body in choice of white, Nile-Green or Ivory-Tan. Time-control (electric) optional.

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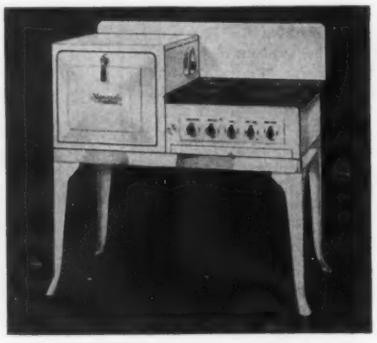

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# ELECTRICAL WEST

With which is consolidated the Journal of Electricity

*McGraw-Hill Company of California*

San Francisco, May 1, 1932

Volume 68

Number 5

G. C. TENNEY, *Editor*


TAX free cities? Government ownership claims many such, yet the coincidence of highest tax rates where largest municipal undertakings are located can't fool a horsefly.

▼

WHAT is a kilowatt-hour worth? Commercial men everywhere ask it, but one Northwestern company found out, based its salesmen's compensation plan on its findings, builds its own and dealers' business thereby.

▼

OLYMPIC games may now run in two shifts if they like, for Los Angeles' Coliseum is well lighted for night contests, even electrified for the most ultra of Hollywood's pageants and spectacles.

▼

"EVERYONE'S self-interest" is more than an idealistic theory, an ideal all-electric apartment tower in southern California testifies. Its construction features are as unique as its electrical facilities are complete.

▼

WHOLESALE and retail, are they mixed or merely merged in the distribution of electrical materials? Certainly lines of demarcation are fuzzy and overlapping, step on each other's toes. A demand for clarity is made by one who knows what his own retailing costs.

▼

OREGON'S lone-handed commissioner does not actually divorce, does demand separate maintenance of merchandising by utilities. The latter accept, reasserting their devotion to their load-building mate and honest intentions toward her.

## The Month

WESTERN utility world lost a staunch and fighting leader, southern California a result-producing business and industrial champion, in the untimely death of John B. Miller. Strange that on the same day the Far Eastern seaboard lost one of its pioneer organizers and utility builders, friend of Edison, Charles L. Edgar, of Boston.

▼

SEATTLE desperately resorts to the old-time swap technique, offers contractors its bonds in trade for the completion of Diablo, providing they will take enough extra bonds to pay off existing deficits as well. Take it or leave it.

▼

SOUTHERN California Edison invokes a principle to save annexed Los Angeles distribution lines and Tulare city distribution from municipal acquisition; points to mere change in ownership of property already in public service, additions to tax exemption, and shifting of added rate burden on contributing agricultural territory.

▼

FISH may be saved from the voracious maws of irrigation and power penstocks electrically, and humans from the itching torment of poison oak medically, by new developments described herein.

# Editorial

## *John Barnes Miller Relieved From Life's Duty*

THIS is a young industry and so young in spirit are its people that a sense of shock attends the passing of each of its electrical pioneers. They seem all too young to leave the work they have so enjoyed building.

Such a shock was the news of the far-too-early death of John B. Miller, 62, the man around whom has been created that wideflung network of power lines and organized personnel known to the West and the world as the Southern California Edison Co. Ltd. For John B. Miller was its organizing genius, he provided the financial sinews without which the great engineering works, hydro and steam plants, 220-kv. transmission lines and widespread distribution system could never have been begun. His was the service of supply, the correlation of engineering plan and financial requirements to the growth of the community and its markets for power, the direction of all of the ramifications of men, materials, money and markets necessary to the sound and consistent growth of so great a company and so important a public service institution.

To those who lived with and knew Mr. Miller, his passing is a great personal loss which they will carry with them to their own rest. But after these, too, have gone there will still remain the personal stamp of John B. Miller upon the entire future of the Edison company.

Engraved in bronze and empaneled in the entrance to the new Edison Building in Los Angeles is a letter whose spirit will outlast the bronze and influence the electrical industry on into the future. It came from Mr. Miller, then president of the company, Sept. 26, 1905, and charged officers and employees as follows:

"The Edison Electric Company desires to have the confidence and respect of the public, with which it deals.

"Officers, agents and other employees should, in every reasonable way, endeavor to increase that confidence and respect by doing everything in their power to make the name of the Edison Electric Company synonymous in the mind of the public for good service, square dealing and courteous treatment.

"The public gains its impression of the company through contact with its representatives, and they will, therefore, be held responsible in every instance for carrying out the well-established policy of the company—'Good Service, Square Dealing, Courteous Treatment.' "

John B. Miller needs no commemorating monument of granite or marble. He leaves behind him a far more fitting memorial in the Edison organization which he imbued with his ideals of public service.

## *Oregon Will Determine What Merchandising Costs*

VALIDITY of one of the principal complaints of dealers against utility merchandising will be tested in Oregon. The public utility commissioner in that state has ruled that henceforth separate accounts must be kept for all merchandising activities and that net profit or losses from such operations must be charged against income from non-operating property. Thus the stockholders will receive the gains or absorb the losses direct and the dealers' charge that huge merchandising losses have been carried by rate-payers will no longer be valid.

There has been too much loose talk on the pros and cons of losses and profits in utility merchandising. Not even the merchandising managers themselves have been able to agree as to whether such operations could be carried on profitably on account of the relatively high cost of pioneering new appliances.

Under the rules laid down in Oregon both dealers and utilities will benefit. The former will find that their complaints have been largely groundless, and the latter will be able to determine the exact cost of merchandising.

## *Who Will Raise The First Price?*

"BUSINESS at any price" seems to be today's only sales tool. If no one bought yesterday or today, then the modern remedy appears to be a price reduction for tomorrow —a price reduction based not on cost or profit but on hope. And no one buys tomorrow so the process is repeated.

Frank Watkins, speaking of tobogganing prices in his notable article, "Who Pays the Reparations for Price Wars?", in the March issue of ELECTRICAL WEST, said, "I appeal most urgently to the stamina and character of every businessman to assert him-

self in no uncertain terms. Call a spade a spade, and brand it as such, so that he who runs may read. We have had our fill of trick hypocrisy, business crooks, demagogic quackery, plain unvarnished lying and deceit, and a full measure of various brands of damn foolishness to muddle our brains and clog our way, and we have suffered it long enough."

This is strong language but it fits the case. If present tactics continue, business is headed either for simple suicide or the damnation bow-wows. Which prompts the question:

Who will raise the first price?

What reason is left tells us that nothing can improve until prices are raised. As long as they toboggan downward, they carry with them investments in factories and machinery, the value of money usefully employed, and the gainful employment of millions whose jobs mean purchases and hence more advancement. There is no sense in any further price drops for any commodity. Nobody can buy goods even at these prices much longer. It is certain that nobody can manufacture them at these levels.

Courage and stamina will be asserted in no uncertain terms in one single action—the raising of the first price. It will be the defiant stroke that should rouse business to its senses. The turning point must be made; it cannot just happen.

The challenge is plain. Is there not among us one who is big enough to accept it?

Who will raise the first price?

## *Do You Cook Electrically?*

"YOU don't cook on an electric range? Then why should I?" There is a fact, succinctly expressed, that the entire membership of the electrical industry must face in putting over its campaign to sell a million electric ranges in the next three years. Call the industry's attitude toward electric cooking by any name—prejudice, doubt, indifference, skepticism or what not—the fact remains that confidence in the product and in the process of electric cookery must start with the industry itself if the campaign is to be successful.

Some power company executives are going to say, "Why, all of our married employees who own their homes cook electrically," or "Ninety per cent of all employees in the Podunk district own ranges." That's fine, and it probably explains the domestic range saturation of 40 per cent in the first case and 50 per cent in the second. But how about the thousands of employees in other utility companies—the salesmen, clerks, service men, engineers, linemen, vice-presidents and general managers? And how about the contractors who must install the wiring, the dealers who are to be an active part of the sales picture, the distributors, the wholesalers, their sales forces, and the manufacturers of associated products who will benefit from the load one million ranges will add to the power company lines? Do they think electric ranges are slow, or expensive? Are they indifferent, or are they behind the campaign heart and soul?

The electric range campaign is going to succeed. The courage of a few manufacturers and a few industry leaders plus the resources they plan to put back of it will see to that. But how much more quickly and how much more easily it would succeed if every member of the industry could look the public squarely in the face and say, "Yes, I cook on an electric range." (P.S.—The editor has an electric range in his home. How about you, dear reader?)

## *Light, Electronics and Crime Prevention*

"ONE 10-watt lamp outside on the nursery corner of the house would probably have saved the Lindbergh baby." This startling statement made by O. H. Caldwell, editor of *Electronics*, in a recent radio address serves to emphasize once more a service that electricity can perform and will perform provided the industry will spread the message to the public.

Lighting men have talked crime prevention in their sales arguments for street lighting, but only sporadic attempts have been made to sell floodlighting to the home-owner as a means of discouraging marauders. Yet today the electrical industry has at its command other devices besides light which can be utilized in both crime detection and crime prevention. The photo-electric cell can be made to sound an alarm if any unauthorized person crosses a window sill of doorway. The grid-glow or thyraton tube will automatically announce the presence of an intruder. Either can be made to switch on floodlights.

Trading on a catastrophe is not pleasant, but there is no reason why lighting men cannot advance as a sales argument the statement that electricity could have prevented the crime which today has the nation aroused.

# The Coincidence of High Taxes And Government in Business

*By* R. H. BALLARD
President, Southern California Edison Company Ltd.

**"Taxing Is an Easy Business. Any Projector Can Contrive New Impositions, and Any Bungler Can Add to the Old; but Is It Altogether Wise to Have no Other Bounds to Your Impositions Than the Patience of Those Who Are to Bear Them?"**

*—Burke*

IN theory, everybody, except the avowed socialist, opposes government in business. Large numbers of our people, however, rush blithely into one such local adventure after another when skilled promoters promise fanciful profits.

Government ownership is the serving-wench of politics. These three things—politics, government-in-business and taxes—are linked together in a vicious system that brings a high cost of living to the people.

There is no particular point in railing at politicians, nor at taxes, nor at specific illustrations of government-in-commercial-business. That to be criticized is the system. The system gives politics control of vast masses of capital; gives politics innumerable opportunities to appoint unfit men to sinecures; invites the creation of powerful political machines—an invitation such that the politician hardly would be human if he did not accept it promptly.

Lately, I have been looking over quite a formidable volume issued by the United States Department of Commerce; it is entitled "Financial Statistics of Cities Having a Population of Over 30,000." The latest copy available is for 1928. Just by way of illustration I should like to quote a few figures from this official publication.

The volume lists "Per Capita Governmental Cost Payments for Operation, Maintenance and Interest" for each of 251 cities. The thirteen cities in the top group each has a population of 500,000 and over, an average per capita cost for operation, maintenance and interest of $64.40. Los Angeles is the highest of the group, with a per capita cost of $80.12.

In the next group, 300,000 to 500,000 population, Seattle heads the list with a per capita cost of $80.56, against a group average of $59.87.

In the third group, 100,000 to 300,000 population, Long Beach has the highest per capita cost, $68.95, against a group average of $43.65.

Coming to the group of cities of 50,000 to 100,000 population, we find Pasadena second from the top with a per capita cost of $87.89, against a group average of $41.58.

Perhaps it is a coincidence that Los Angeles with its ambitious projects for municipal business should head the list of large cities in per capita cost of government, or that Seattle with its municipal railways and municipal electric service should head the next group, and that Long Beach with its municipal gas enterprise should be at the head of the third division, or that Pasadena with its municipal electric lighting system should lie second from the top of the fourth group. Nevertheless, the coincidence is somewhat striking.

The system of government ownership brings high taxes. Why? It is partly a state of mind. When that intangible thing we call public thought is turned by political adventurers toward municipal business adventure, we find that what is exemplified by that foolish trend runs through all of the public affairs of that city. We find that the tendency to public extravagance in such a municipality goes far beyond one single act of unwisdom; it means that all public affairs in that city are handled in accordance with the then popular policy of inefficiency, waste and extravagance. We find then, that a politico-business machine is set up to control elections and to preserve rich pickings for politicians in that city. That a city is in the electric light business, for example, does not mean that the losses or the profits of that particular industry must be added to or subtracted from tax bills; that, of course, will happen, but the real meaning is deeper. The real meaning lies in an indication of political unsoundness that runs through the entire body politic of that city. It is, I think, for this reason and not because of the profits or the losses that accompany some particular municipal business adventure, that we find governmental costs so extravagantly high in each of the communities in which the public has tried this or that socialistic experiment.

The latest audit of the Water and Power Department of Los Angeles indicates taxpayers and water users have donated free capital, and free interest thereon to the joint business, in an amount that foots up to more than $78 millions, and for which more complete figures would

*From an address delivered before the California State Chamber of Commerce, Del Monte, Calif., in March.

doubtless add up to around $100 millions. The important thing is not this startling figure, but the astonishing fact that while the huge totals were piling up, the public permitted itself to be beguiled with tales of fanciful profits.

When public opinion consents to one sort of waste, it is likely to permit another. Such a community is likely to be found near the top of the cost-of-government-per-capita list.

I do not believe the difference in per capita costs between the averages and the maximums reached in those cities that have one kind or another of municipal ownership is even principally due to those particular ventures; it is due rather to the public opinion that fosters not only those but other and similar follies, which add up all together to the high and excessive costs of government in those localities.

Perhaps the two countries that have gone furthest in the direction of socialism, without frankly admitting their ultimate goal, are Australia and New Zealand. In Australia the state or the municipalities own and operate railroads, telegraph and telephone systems, electric systems, water power plants, hotels, cafes, farms, land, mines, shops, markets, ships, street railways, gas plants, electric power plants, coal yards, packing houses, wholesale and retail meat and fish markets, implement factories, locomotive shops, saw mills,. sugar mills and many other sorts of enterprise (*Public Opinion*, June 1, 1931). In these countries 95 per cent of all publicly owned enterprises are losing money and annually increasing their debts. The average freight rate per ton per mile is 3.79c. as contrasted with 1c. per ton mile in the United States. The net receipts of Australian railroads last year lacked more than $10 millions of paying their interest charges, to say nothing of the loss in taxes and the very high freight rates.

Naturally all of these things were accompanied not merely by a tremendous increase in the public debt of Australia, but in a steady increase in its quantity of tax-free capital, with taxable property increasingly limited. The additional taxes due to economic failure of the government-owned enterprises fall with crushing weight upon the six out of seven people who are not working for the government. In 1927 the net deficit on all business undertakings in Australia amounted to more than 1½ per cent on all of the capital expense. Since then a bad situation has become worse (*The Annals*, November, 1931, p. 198).

Not the least of such results is found in the effect of government ownership upon taxes. The first government ownership projects in Australia were relatively insignificant, but each adventure took some capital off the tax rolls, put a few people in the position of living off direct and indirect taxes. The next project accentuated both the increase in taxes and the urge for more government ownership. That unhappy country has now reached the stage mentioned, where one man out of every seven is working for the government, where capital amounting to possibly as much as $5 billions is tax free and is returning deficits, and where the only way out seems to be through more government services of a social nature, to relieve distress—indeed, through still further extensions of government control until everything is done by the government, nothing by the individual.

*. . . Government ownership is the serving-wench of politics . . . .*

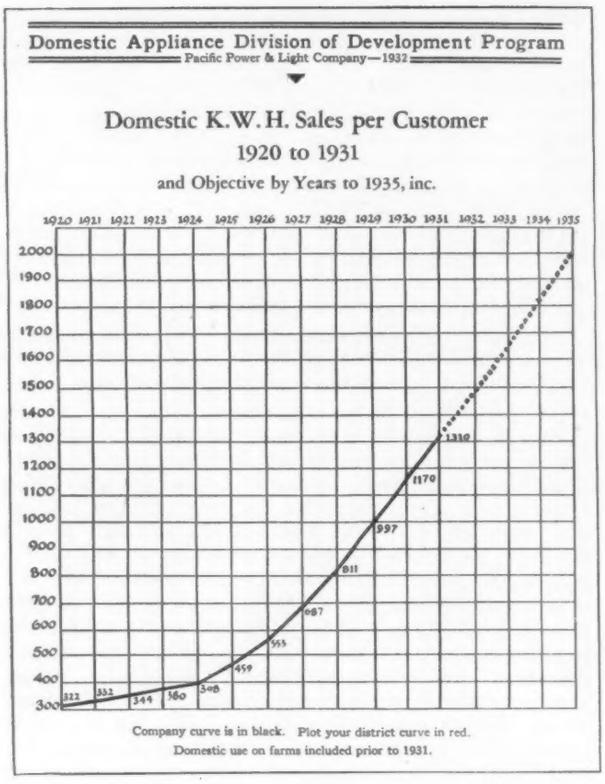
In Australia the repudiation of current debt payments by the state of New South Wales and the assumption of that burden by the whole commonwealth of Australia is recent and well known.

Russia exemplifies the most thorough socialism of which we know. Government ownership in Russia is almost complete and rapidly is being extended. The latest step was to nationalize the farm lands of peasants who were slightly above the Russian economic scale of penury. Under such a radical socialism as Russia now enjoys, the question of taxes takes a new slant. One man may tell you that in Russia there are no taxes. Another man may say that all of Russia's national income is paid in taxes. Each man is correct in a sense. For practical purposes, however, we may say that the total national income of Russia is taken from the people. True, the people are not presented with tax bills. Having no income beyond subsistence, they could pay nothing. The simple procedure of taking from the public all of the products of labor not necessary to bare existence in such squalor as we can hardly imagine, is at least thorough; it completes the cycle of mounting taxes as government ownership expands; it is the logical end of the path on which we first set foot when we put a city, a state, or the national government in one commercial business.

I will not take time to discuss the tremendous deficit and the consequent taxes that flow from the Canadian system of government-owned railways; from the Canadian "hydro" system; or from the government-owned railways of Germany (which were turned over to the management of a private corporation in order that they might begin to pay profits that would aid in reparations); nor shall I mention any other of the many instances in which the "Gold Dust Twins" of government ownership and high taxes put their act on the stage.

The states of North and South Dakota went wild on state-owned business enterprises long enough ago so that we now can interpret the results. State flour mills, grain elevators, cement mills, coal mines, banks, insurance and other schemes were blithely established. Not one single business adventure in the entire list has been successful. In some instances the losses have been all but complete. The poor taxpayer has had to pay the bills. What has been the result?

It is reported that more than one-half of all of the farms in one of the Dakotas have been sold for taxes. Whether the exact number is a little more than half or a little less than half, I do not know, but it is common knowledge that enormous numbers of farmers have lost their properties. There were, of course, other factors besides government-ownership that contributed to this terrible outcome. As I pointed out in the beginning, it is the system, not the details, that is important. A community that is so unsoundly radical as to engage in government-owned commercial business is a community in which the stage is set for all sorts of other chimerical rushes for the pot of gold that lies at the foot of the rainbow. Taxes will ultimately ruin any such community except there be a return to sound thinking.




**"New business development is a fundamental part of our industry and must be carried on just as our power plants must run; just as our service must be maintained; just as our accounts must be kept.**

**"That company which makes no effort to secure additional business eventually will lose that which it now has.**

**"Consider all dealers in electrical goods for home and farm as your partners in this enterprise. Work together and carry the program to a successful conclusion."**

**GUY W. TALBOT**
**(The president's message to all employees)**

# Constantly Improved But No Yearly Model

**Pacific Power & Light Co. Strengthens the Dealer Participation Features of Its Already Successful Load Building Sales Program**

RUSSIA gets a great deal of credit these days for having a "Five-Year Plan" and for working according to that plan. The implication is that America has no such planned industry, is groping blindly or plunging madly along. In certain phases of the electrical industry this is only too true. But in central station operations, even in merchandising and load building generally, this is scarcely ever true.

In fact, no doubt much of the irritation which has come to light in recent months relative to power company merchandising is rooted in the contrast between the success of the planned, consistent programs of utility companies in selling and the relatively unsuccessful haphazard selling of uncontrolled competition in and between other branches of the industry. Unfortunately few of the dealers whose voices are loudest in condemnation of power company selling recognize the real reason for their own lack of volume in lack of plan, lack of method, lack of control of their own situation.

One of the most successful load building companies of the West has been the Pacific Power & Light Co., operating in rural communities almost exclusively, in Oregon, Washington and until last year in southern Idaho. (The latter properties were taken over by The Washington Water Power Co. last year.) The success of these load building activities has been noticeable from the beginning of planning, in 1924, when V. H. Moon, sales man-

**Estimated Appliance Sales by Months**
ALL DISTRICTS

| Appliance | Jan. | Feb. | Mar. | April | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. | Totals |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Ranges** | 54 | 56 | 87 | 167 | 185 | 179 | 84 | 72 | 60 | 54 | 86 | 141 | 1,225 |
| **Water Heaters** | 45 | 53 | 71 | 146 | 161 | 158 | 74 | 59 | 47 | 45 | 71 | 120 | 1,050 |
| **Refrigerators** | 7 | 71 | 108 | 145 | 242 | 235 | 109 | 80 | 72 | 71 | 90 | 111 | 1,350 |
| Washers | 40 | 40 | 60 | 60 | 60 | 60 | 60 | 40 | 200 | 300 | 40 | 40 | 1,000 |
| Ironers | 24 | 24 | 36 | 36 | 36 | 36 | 36 | 24 | 120 | 180 | 24 | 24 | 600 |
| Radios | 60 | 50 | 40 | | | | | | | 40 | 50 | 60 | 300 |
| Vacuum Cleaners | 30 | 40 | 60 | 60 | 60 | 60 | 40 | 30 | 30 | 30 | 30 | 30 | 500 |
| Sun Lamps | 80 | 40 | | | | | | | | 20 | 80 | 30 | 250 |
| Lamps | 7,000 | 5,000 | 4,000 | 3,500 | 3,500 | 3,500 | 3,500 | 5,000 | 6,000 | 6,000 | 6,000 | 7,000 | 68,000 |
| Waffle Irons | 30 | 20 | 20 | 30 | 15 | 15 | 15 | 15 | 30 | 20 | 110 | 60 | 360 |
| Electric Clocks | 30 | 16 | 16 | 16 | 16 | 16 | 15 | 15 | 80 | 70 | 20 | 40 | 350 |
| Percolators | 50 | 20 | 150 | 70 | 20 | 20 | 20 | 20 | 20 | 20 | 30 | 60 | 490 |
| Flat Irons | 60 | 50 | 50 | 50 | 100 | 100 | 50 | 100 | 100 | 50 | 50 | 80 | 1,000 |
| Cookers | 10 | | | 15 | 15 | 80 | 40 | 15 | | | 10 | 15 | 200 |
| Toasters | 50 | 100 | 50 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 100 | 500 |
| Hot Plates | 10 | 10 | 15 | 20 | 30 | 30 | 140 | 65 | 10 | 10 | 10 | 10 | 360 |
| Space Heaters | 40 | 30 | | | | | | | | 130 | 60 | 40 | 300 |
| Mixers | 20 | 5 | 10 | 60 | 40 | 15 | 5 | 5 | | | | 40 | 200 |

"The sales policies of your company have been formulated to create satisfied customers, friendly dealers, and to build domestic load rapidly and economically. It is your job to know these policies and to make sure that they are carried out to the letter in every contact you make . . . . In your territory these policies can be effective only when you know them and follow them. You can create a friendly feeling among your customers and dealers or leave them dissatisfied . . . The character of your effort will either bring to our customers a full understanding of the fair policies of your company or will leave them disgusted with an organization that preaches one thing and practices another . . . . Know your company policies, believe in them and practice them. Do your job right."

V. H. MOON

(Salesmanager's instructions to territorial representatives)

ager, was placed in charge of merchandising sales. The plan then is eight years old, instead of a "five-year plan."

A significant thing about this plan has been its growth, or evolution. In basic features it has held closely to certain fundamental objectives. But with the variations of environmental conditions it has been fitted to meet these changes, be they in economic conditions, growth or recession of industrial activity in the respective areas served, experience of the sales staff, introduction of new appliances, acceptance and saturation of appliances, interest of dealers in selling and any other factor bearing on the particular year or season.

Last year, for example, the basis of salesmen's compensation was changed and this year that basis is enlarged to include in it credit for sales made by dealers in their territorial assignment. In this new basis of compensation the emphasis is moved entirely from the dollar-volume-of-merchandise-sold basis to a revenue-value-of-the-appliance-to-the-company basis. This value is determined by past experience with the appliance.

Before considering the details of the plan as it operates this year, or of the particulars of the compensation for salesmen, it is of real interest to note the manner in which the value of the various classes of load to the company has been derived. In so many quarters there has been heard the sales manager's cry, "How much is a kilowatt of such and such load worth to the company?" In the case of this company it took particular pains to find out. A letter to President Talbot last July from V. H. Moon reported the following information:

"A survey made by our rural representative of 2,186 farms shows the following saturation of major appliances:

| Appliance | No. in Use | Percentage of Saturation |
|---|---|---|
| Ranges | 388 | 17 |
| Refrigerators | 137 | 6 |
| Washers | 1,493 | 68 |
| Ironers | 43 | 2 |
| Water heaters | 165 | 8 |
| Radios | 1,222 | 55 |
| Motors | 83 | 4 |
| Irrigation pumps | 345 | 16 |
| Domestic water pumps | 496 | 23 |
| Feed grinders | 9 | 4 |

"Several times we have been asked the source of our relatively high kilowatt-hour consumption by residential customers. Using this information, furnished by Mr. Leonard, in combination with our known saturation figures, we can make a good analysis of the source of our domestic use. At the end of June our average domestic kilowatt-hour consumption for the year was 1,252 kw.-hr.

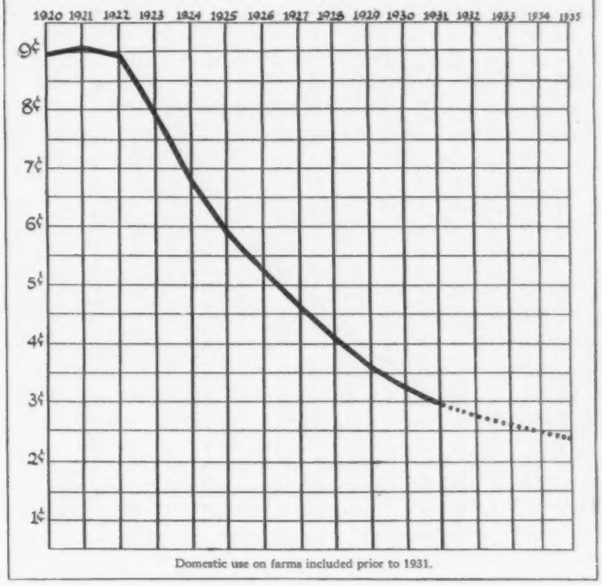
**Domestic Appliance Division of Development Program**
Pacific Power & Light Company—1932

**Estimated Appliance Sales by Districts for the Year**

| | Ranges | Water Heaters | Refrigerators | Washers | Ironers | Radio | Vacuum Cleaners | Sun Lamps | Lamps | Waffle Irons | Electric Clocks | Percolators | Flat Irons | Cookers | Toasters | Hot Plates | Space Heaters | Mixers |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Astoria | 66 | 55 | 72 | 53 | 32 | 16 | 26 | 13 | 3,300 | 19 | 20 | 26 | 53 | 11 | 26 | 19 | 16 | 11 |
| Bend | 93 | 79 | 101 | 75 | 45 | 23 | 37 | 19 | 4,500 | 27 | 28 | 37 | 75 | 15 | 37 | 27 | 23 | 15 |
| Dayton-Waitsburg-Pomeroy | 61 | 53 | 65 | 50 | 30 | 15 | 25 | 13 | 3,000 | 18 | 19 | 25 | 50 | 10 | 25 | 18 | 15 | 10 |
| Enterprise | 36 | 31 | 40 | 30 | 18 | 9 | 15 | 8 | 1,800 | 11 | | 15 | 30 | 6 | 15 | 11 | 9 | 6 |
| Goldendale | 21 | 18 | 23 | 17 | 10 | 5 | 9 | 4 | 1,000 | 6 | 6 | 8 | 17 | 3 | 9 | 6 | 5 | 3 |
| Hood River-White Salmon | 85 | 73 | 95 | 70 | 42 | 21 | 35 | 18 | 4,200 | 25 | 26 | 34 | 70 | 14 | 35 | 25 | 21 | 14 |
| Pasco-Kennewick | 86 | 74 | 95 | 70 | 42 | 21 | 35 | 18 | 4,200 | 25 | 26 | 34 | 70 | 13 | 35 | 25 | 21 | 13 |
| Pendleton | 83 | 71 | 90 | 67 | 40 | 20 | 33 | 16 | 4,000 | 24 | 24 | 33 | 67 | 13 | 33 | 24 | 20 | 13 |
| Prosser | 28 | 24 | 31 | 23 | 14 | 7 | 12 | 6 | 1,400 | 8 | 9 | 11 | 23 | 5 | 12 | 8 | 7 | 5 |
| Reardan | 28 | 24 | 31 | 23 | 14 | 7 | 12 | 6 | 1,400 | 8 | 9 | 11 | 23 | 5 | 12 | 8 | 7 | 5 |
| Sherman | 33 | 28 | 34 | 25 | 15 | 7 | 13 | 6 | 1,500 | 9 | | 12 | 25 | 5 | 13 | 9 | 7 | 5 |
| Sunnyside-Grandview | 76 | 65 | 85 | 62 | 37 | 19 | 31 | 16 | 3,700 | 23 | 22 | 31 | 62 | 13 | 31 | 23 | 19 | 13 |
| The Dalles | 81 | 70 | 90 | 67 | 40 | 20 | 33 | 16 | 4,000 | 24 | 26 | 33 | 67 | 13 | 33 | 24 | 20 | 13 |
| Toppenish-Wapato | 84 | 72 | 94 | 69 | 41 | 21 | 35 | 17 | 4,100 | 25 | 24 | 34 | 69 | 14 | 35 | 25 | 21 | 14 |
| Walla Walla | 141 | 121 | 155 | 115 | 69 | 35 | 57 | 29 | 6,900 | 43 | 43 | 56 | 115 | 23 | 57 | 42 | 35 | 23 |
| Yakima | 225 | 194 | 249 | 184 | 111 | 56 | 92 | 46 | 11,100 | 66 | 68 | 90 | 184 | 37 | 92 | 66 | 54 | 37 |
| **Totals** | **1225** | **1050** | **1350** | **1000** | **600** | **300** | **500** | **250** | **60,000** | **360** | **380** | **490** | **1000** | **200** | **500** | **360** | **300** | **200** |

**Domestic Appliance Division of Development Program**
Pacific Power & Light Company—1932

Average Cost per K.W.H. of all Domestic Service 1920 to 1931, and Objective by Years to 1935, incl.




Domestic use on farms included prior to 1931.

Using the information in the manner mentioned above, the sources of this domestic use are as follows:

| Appliance | No. in Use on System as of June 30, 1931 | Percentage Saturation | % of Average Annual Kw-hr. Consumption Assignable to This Appliance | No. of Kw.-hr. Assignable to Use of This Appliance |
|---|---|---|---|---|
| Ranges | 8,080 | 19.4 | 23.3 | 291 |
| Water heaters | 5,480 | 13.1 | 37.6 | 472 |
| Refrigerators | 4,600 | 11.0 | 4.4 | 55 |
| Radio | 23,000 | 55.0 | 6.6 | 82 |
| All other appliances | ..... | ..... | 12.0 | 150 |
| Domestic lighting | ..... | ..... | 16.1 | 202 |
| | | | 100 % | 1,252 |

"This is the first time in my memory that we have made any attempt to analyze the source of our annual residential use. Further analysis, using this information, might be interesting, such as the estimated plant requirements per dollar of revenue received for each type of appliance, and other similar studies.

"I believe that the figures shown above are fairly accurate. Our range and water heater figures are based on an actual count made in November of last year, with sales made by ourselves and dealers since that date added to the count. We have no count of refrigerators in use and use 11 per cent as a representative saturation figure. The 55 per cent saturation of radios is based on the 2,186 farms visited, and it is my opinion that saturation of radios in our urban centers would be somewhat higher than the rural saturation figure used above. The 150 kw.-hr. assigned to all other appliances is an estimate for lighting use from the kilowatt-hours remaining after assigning the values to the four appliances shown above."

From this survey, made last summer, the basis for this year's program on a revenue valuation was plotted. The 1932 appliance quotas were translated into terms of estimated kilowatt-hour consumption, total kw.-hr., rate per kw.-hr. and estimated total annual revenue as detailed in the following table:

| Appliance | Estimated Sales | Estimated Annual Kw.-hr. Consumption | Total Kw.-hr. | Rate per Kw.-hr. | Estimated Total Annual Revenue |
|---|---|---|---|---|---|
| Ranges | 1,225 | *1,500 | 1,837,500 | 0.03 | $ 55,125.00 |
| Water heaters | 1,050 | 3,600 | 3,780,000 | 0.06 | 22,680.00 |
| Refrigerators | 1,350 | 500 | 675,000 | 0.04 | 27,000.00 |
| Washers | 1,000 | 40 | 40,000 | 0.05 | 2,000.00 |
| Ironers | 600 | 125 | 75,000 | 0.05 | 3,750.00 |
| Radio | 300 | 150 | 45,000 | 0.05 | 2,250.00 |
| Vacuum cleaners | 500 | 30 | 15,000 | 0.05 | 750.00 |
| Sun lamps | 250 | 100 | 25,000 | 0.05 | 1,250.00 |
| Lamps | 60,000 | 1.8* | 108,000 | 0.05 | 5,400.00* |
| Waffle irons | 360 | 23 | 8,280 | 0.05 | 414.00 |
| Electric clocks | 350 | 15 | 5,250 | 0.05 | 262.50 |
| Percolators | 490 | 50 | 24,500 | 0.05 | 1,225.00 |
| Flat irons | 1,000 | 72 | 72,000 | 0.05 | 3,600.00 |
| Cookers | 200 | 111 | 22,200 | 0.05 | 1,110.00 |
| Toasters | 500 | 50 | 25,000 | 0.05 | 1,250.00 |
| Hot plates | 360 | 200 | 72,000 | 0.04 | 2,880.00 |
| Space heaters | 300 | 40 | 12,000 | 0.05 | 600.00 |
| Mixers | 200 | 20 | 4,000 | 0.05 | 200.00 |
| Total | | | 6,845,730 | | $131,746.50 |

* Additional revenue from lamp sales based on estimated average increase of 5 watts in size of lamp sold over lamp replaced. Burning hours estimated at 360 per year. 360×5=1.8 kw.-hr.

In the presentation of the plan to the individual salesmen or territorial representatives this again has been broken down in several ways. To begin with, the territorial representative is made responsible for load building and revenue development among the domestic or rural customers in the territory established as his assignment. He receives credit on the numerical quota for all company sales of load building appliances in his territory, plus sales made by local dealers, excepting only quantity sales. The following items are included in this program: ranges, flat-rate water heaters, booster water heaters, refrigerators, dairy sterilizers, livestock water warmers, domestic pressure water systems, poultry brooders, poultry water warmers.

The territorial representative receives a specific quarterly assignment on the following six items: ranges, flat-rate water heaters, refrigerators, washers, ironers and radios. These are the only items actually sold by the company. (Small appliances, however, are sold by the company at its offices.) It will be noted that these six items are each of sufficient merchandise gross value as to assist in supporting the sales work of the company, a necessary feature to make this load-building activity self supporting.

Besides their base salaries, then, the territorial representatives receive a load-building bonus on all of the items first listed above. This bonus is a percentage of the estimated annual revenue anticipated from all company and dealer sales of the load-building appliances for which the representative is credited. The percentage, however, is determined on the salesman's performance on

## Domestic K.W.H. Sales Statistics

| DISTRICT | Av. No. Residential Customers 12 Mo. end'g Nov. 30, 1931 | GAIN over same period 1930 | Av. K.W.H. Sales per Residential Customer 12 Mo. end'g Nov. 30, 1931 | GAIN over same period 1930 | Average Revenue per Residential Customer 12 Mo. end'g Nov. 30, 1931 | GAIN over same period 1930 | Average Cost per K.W.H. to Customer 12 Mo. end'g Nov. 30, 1931 | GAIN over same period 1930 |
|---|---|---|---|---|---|---|---|---|
| Astoria | 2,785 | 13 | 588 | 90 | $33.01 | $1.28 | $.0561 | $.0051* |
| Bend | 2,997 | 58* | 1,995 | 129 | 39.75 | .25* | .0199 | .0012* |
| Dayton-Waitsburg-Pomeroy | 1,528 | 1* | 1,397 | 13 | 40.60 | .01* | .0290 | .0005 |
| Enterprise | 725 | 48* | 1,541 | 89 | 36.09 | 2.47* | .0234 | .0028* |
| Goldendale | 449 | 15 | 1,039 | 105 | 37.47 | 1.32 | .0361 | .0019* |
| Hood River-White Salmon | 1,403 | 62 | 1,668 | 72 | 42.72 | 1.81 | .0256 | .0002 |
| Pasco-Kennewick | 1,459 | 30 | 1,867 | 160 | 48.67 | 2.65 | .0260 | .0008* |
| Pendleton | 2,001 | 18 | 1,277 | 292 | 39.12 | 2.55 | .0307 | .0059* |
| Prosser | 458 | 9 | 1,750 | 44 | 45.48 | .98 | .0258 | .0001 |
| Seaside | 1,155 | 99 | 419 | 67 | 27.81 | .41 | .0642 | .0111* |
| Sherman | 1,066 | 42* | 1,165 | 126 | 43.56 | 1.96* | .0374 | .0054* |
| Sunnyside-Grandview | 1,002 | 36 | 1,256 | 30* | 40.46 | 1.59* | .0324 | .0006 |
| The Dalles | 1,844 | 10 | 1,992 | 149 | 45.29 | 1.09 | .0233 | .0002* |
| Toppenish-Wapato | 1,488 | 67 | 1,449 | 115 | 41.21 | .57 | .0285 | .0011* |
| Walla Walla | 4,559 | 103 | 1,037 | 171 | 36.73 | 1.33 | .0378 | .0017* |
| Yakima | 8,198 | 535 | 1,240 | 180 | 38.93 | 2.26 | .0314 | .0025* |
| TOTALS | 33,117 | 822 | 1,310 | 125 | $39.16 | $1.10 | $.0301 | .0015* |

Domestic use on farms not included. * Decrease

the six assigned appliances: namely, range, water heater, refrigerator, washer, ironer, and radio. It is determined as follows:

If the salesman sells his full assignment of six of the six items, he receives an 8 per cent bonus on the total estimated revenue from all of the load-building appliances sold by him or the dealer during that quarter. If assignment is reached on five of the six items, he gets 6 per cent; on four of the six, 4 per cent; on three of the six, 2 per cent.

While the rate of bonus is based on sales performance with the six appliances, it is necessary that the estimated annual revenue of all of the items for which he may receive bonus credit be evaluated. For the purpose of crediting the salesman with his load-building achievement the following have been set up as the revenue expectancies for each of these items:

| | |
|---|---|
| Dairy sterilizers, steam boiler type | $54.00 |
| Ranges | 45.00 |
| Livestock water warmers, 1,000 watts or over | 31.50 |
| Flat-rate water heaters | 21.60 |
| Refrigerators | 20.00 |
| Domestic pressure water systems | 15.00 |
| Poultry brooders | 10.50 |
| Booster water heaters | 9.00 |
| Radios | 7.50 |
| Ironers | 6.25 |
| Poultry water warmers | 3.00 |
| Washing machines | 2.00 |

The bonuses are paid at the end of the quarter. Quantity sales are not credited, neither are sales to educational institutions at other than established retail list

prices. The territorial representative is not credited with the sale of an appliance when a similar electric appliance has been taken in trade. If the sale replaces other equipment which is to be junked or dismantled he receives full credit. Reverts are deducted from sales already credited. All of these provisions apply alike to company or dealer sales.

### Five Books Contain the Plan

"It looks as though we began a library instead of a sales plan," commented Mr. Moon, as the purposes of each part of the plan were explained. Formerly the entire year's sales plan and quotas were contained in one loose-leaf binder pamphlet. This year, however, its various parts are bound separately, chiefly because the plan is one of coordinating the efforts of the district managers, the district representatives, and the dealers.

Hence there is first the "Development Program" booklet which outlines all the activities in the domestic, lighting and farm electrification divisions. In it are contained the executives' messages to the dealers and sales staff, the schedule of sales activities for the year, the quotas or estimated appliance sales broken down by months and by districts, a chart showing the domestic kilowatt-hour sales statistics for the past year, charts of domestic consumption, of cost of electricity (the latter five are reproduced with this article), range and water heater statistics, and report forms for the recording of this year's sales, with space for cumulative totals by quarters on the appliances for which the bonuses are paid. The lighting sales set-up is also included, and a separate section is given over to the farm electrification program.

A second booklet, "Territorial Assignment," is furnished the territorial representative or domestic sales-

**Dealers Monthly Report**

TO

PACIFIC POWER & LIGHT COMPANY

_____ 1931 (Month) _____ (Name of Dealer) _____ (Town)

Please furnish monthly the information requested below on your sales of the following electrically operated appliances:

**DOMESTIC APPLIANCES**: Ranges; Water Heaters (Flat Rate); Water Heaters (Booster); Refrigerators

**FARM APPLIANCES**: Dairy Sterilizers; Live Stock Water Warmers; Domestic Pressure Water Systems; Poultry Brooders; Poultry Water Warmers; Motors; Irrigation Pumps; Misc. Electrical Farm Equipment

| No. Sold | APPLIANCE SOLD | Size or Type | NAME OF PURCHASER | ADDRESS | Shall Our Home Economist Call? | Shall Our Rural Representative Call? |
|---|---|---|---|---|---|---|
| | | | | | | |

*Form on which dealers are asked to report their sales of the load-building items for which the territorial representative of the company may be credited. Naturally, to receive this cooperation from the dealer the representative must keep the dealer convinced of his value to him as a help to his own sales*

man. It contains his quotas and report forms as well as instructions as to the basis of bonus payments and other pertinent information. No distinction is made in this book between company and dealer sales and no stress placed on dollar volume, as in the past.

District managers get a third booklet, designed to give them their quotas, their past accomplishments, and report form for the recording of dealer sales and their own staff sales for the district.

Rural representatives receive the fourth booklet, giving them their own quotas, schedules of company rural advertising and report forms for the reporting of sales by dealers on the special load-building lines of interest to the company.

"Announcement to Electric Appliance Dealers" is the fifth booklet, and it contains messages from the sales manager and the president of the company, a schedule of company sales activities so that the dealer may participate in them, and monthly report forms as to the sales made by the dealer receiving it each month. The heading of the form, showing the information asked of the dealer, is illustrated here. Reports are in duplicate, the dealer keeping one for his own records or to serve as a stimulant to his own selling activity.

That consistent planning and equally consistent sales effort reward a company, and will reward equally a dealer who makes use of them, is given best testimonial in the record of the domestic kilowatt-hour sales per consumer in the various districts of this company. If any more proof of the effectiveness of this company's effort is needed than these figures, that proof would be hard to find. Of the sixteen districts, all but two show average domestic consumption per customer of over 1,000 kw.-hr. per year, six are over 1,500 kw.-hr. and two over 1,900 kw.-hr., and the average of the entire system is 1,310 kw.-hr.

Such consumption, and by token of the analysis of what component parts this consumption is made up, as listed in the foregoing, serves as a challenge to the electrical industry to see that homes everywhere make use of the benefits of electrical service to a like extent.

▼

# No Fixture Forest Here

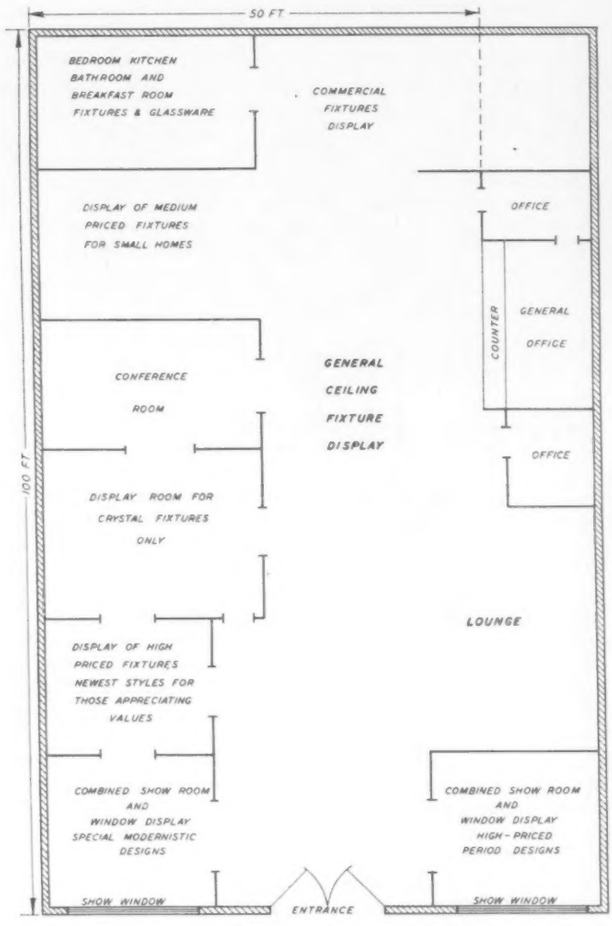
NO CONFUSION or bewildering forest of fixtures meets the eye of the customer who goes to buy lighting fixtures in the M. J. Walsh store in Portland. That sort of merchandising perhaps has its place, but not here. Yet this is not a store catering to the exclusive trade; in it are fixtures to meet the needs of the most modest residence as well as the most pretentious home. How to get around the problem of selling anybody and everybody, how to show plenty of fixtures at all prices and not be cluttered up, how to show the most expensive and exclusive designs without scaring away the average customer who may be possessed with the passing desire to buy a single bathroom fixture, is a problem which has been met with unusual cleverness in the layout and treatment of the display rooms.

In addition to the general display room and that part devoted to commercial units, running from the main reception area and lounge back to the rear, there are two combination display and show-window rooms and five

*Entrance to the M. J. Walsh store*

other individual display rooms, as shown in the accompanying drawing. The combined show windows and display rooms on each side of the entrance are 16 ft. square with full glass on the street side, and displays can be changed at frequent intervals, as is the case with any show window. These window rooms are what attract customers into the store. And the salesmen know human nature as well as fixtures.

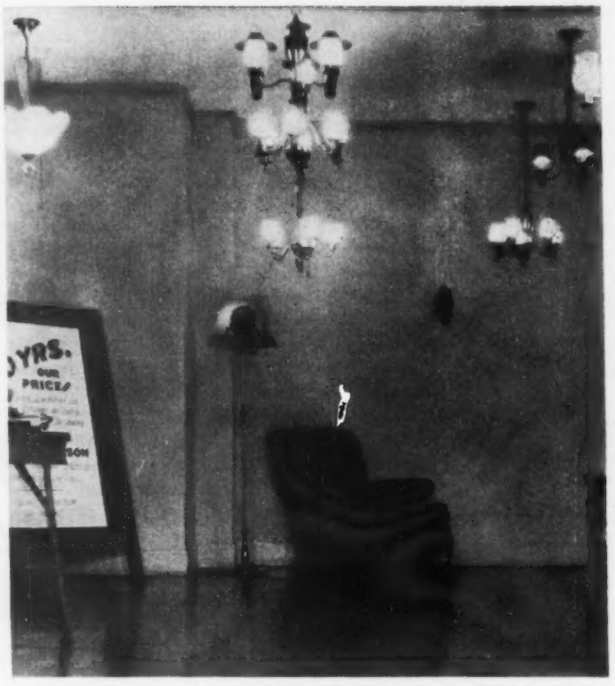
Suppose you, as a prospective customer, entered. The salesman would soon find that you are building a $25,000 home up on the hill and that you are interested in interior designs. At first he shows you a few well selected designs in the window and display room at the right. Or suppose you are interested only in special, individual de-


50 FT.
100 FT.
BEDROOM KITCHEN BATHROOM AND BREAKFAST ROOM FIXTURES & GLASSWARE
COMMERCIAL FIXTURES DISPLAY
DISPLAY OF MEDIUM PRICED FIXTURES FOR SMALL HOMES
OFFICE
COUNTER
GENERAL OFFICE
CONFERENCE ROOM
GENERAL CEILING FIXTURE DISPLAY
OFFICE
DISPLAY ROOM FOR CRYSTAL FIXTURES ONLY
LOUNGE
DISPLAY OF HIGH PRICED FIXTURES NEWEST STYLES FOR THOSE APPRECIATING VALUES
COMBINED SHOW ROOM AND WINDOW DISPLAY SPECIAL MODERNISTIC DESIGNS
COMBINED SHOW ROOM AND WINDOW DISPLAY HIGH-PRICED PERIOD DESIGNS
SHOW WINDOW
ENTRANCE
SHOW WINDOW

*This floor plan is instrumental in helping fixture sales for the Walsh company because of neat design and clever routing*

signs. You are taken to the special, modernistic window room for a time and then back into the conference room where drawings of special designs from the designing department are brought out for your inspection. Here your own ideas of what you want are carefully noted and are discussed with the designer while you are there.

Suppose, on the other hand, your house is to be in the $5,000 class. Quick mental arithmetic on the part of the salesman sets a figure of $75 to $100 for fixtures, and you are taken at once to the general display. Here there is equal opportunity for creative salesmanship. While these fixtures are all of good quality and of modern design, you, as a customer, may prove to be more discriminating than was at first evidenced. You may wish to see how the fixtures are going to look in a room. Then the salesman



*Display room for better grade fixtures, just back of south window display room. Modernistic fixtures, crystal fixtures, and similar designs each have a separate display room*

will take you to the display room immediately back of the window display, where are fixtures of a better quality and of the very latest style, but fewer in number and more effectively displayed. If you have a real appreciation of values and your resources permit, you may buy here and place a larger order than you had anticipated. Or, from the general display you may be taken to the second room from the rear, devoted to medium-priced fixtures for the small home, a grade in between the two just mentioned. The salesman uses his judgment after he has had an opportunity to talk with the prospect to get all angles of the case.

Or, perhaps you are simply a man with an idea that a shaving light in your bathroom is not right and that you ought to be able to get something for about $3 that will be a whole lot better. You are taken back the whole length of the store to a special room devoted to that class of merchandise, where you will find an ample variety from which to select. The room is located in back purposely because on your way in or out you pass through the general display. Should you show any interest in

*Lower-priced fixtures are shown in this room. Restraint in hanging few fixtures has been shown even here*

other types of fixtures, the salesman takes you on a little journey through the other rooms—a journey that may lead to anything that your pocketbook can stand, provided you are in the market for something else. It is the old "sell them something more" idea over again.

And so it goes. Practically any combination of customer needs and customer pocketbooks is intelligently handled in the one store, wherein there is the atmosphere throughout of quality—retaining an exclusive character without embarrassing any class of prospect. A sincere desire to ascertain the customer's requirements and then to furnish the right answer to his problem animates the personnel of the company, and the store arrangement greatly facilitates the carrying out of this desire.

▼ ▼ ▼

# No Genealogist Is Required With This File System

WHEN a large number of appliances leave the sales floor and the stockroom daily, for demonstrations, the problem of safeguarding against losses is a pertinent one to the electrical dealer. R. B. Condon, manager of the Benjamin Franklin Electric Co., in Seattle—a shop with the record of selling more Haag washers than any other dealership in the United States—has studied the problem for a long time and has used various ways and means to solve it. But no control system has approached the one he now uses for composite performance.

The system provides for an original card record which can be filed numerically, or according to machine number. This is in contrast with most systems, which are limited to a chronological filing of data, making it difficult or impossible to check back on the history of the machine. A cloudy history or an incorrect one does not occur with this company's system and there is rigid control during the network of demonstration detours.

An "In and Out card," 4x6 in., is the basis of this system. The same form is used for checking in, or out,

OUT
IN
CARD DATE
SERIAL NUMBER
ARTICLE
MODEL
DATE
PRINT LAST NAME
KEEP TO RIGHT
S. R. DATE
C
IN FROM
IN BY
CONDITION
CHECKED BY
2582
OUT TO
ADDRESS
CONDITION
CHECKED BY
The above merchandise is accepted IN TRUST, to be sold at prices and terms acceptable to the BEN FRANKLIN ELECTRIC Co. Title to the merchandise and all proceeds of sale shall remain with the said company. It is understood I am to report every morning at opening hour and each evening before closing hour. I agree to be responsible to the company for any damage to the merchandise in my hands.
SALESMAN SIGN HERE
Sound Prg. 3M 1-31

*File card used by Benjamin Franklin Electric Co.*

by designating with a check which purpose it is to perform.

In the upper left-hand corner is the serial number (for trigger reference the seven squares in the serial number space are always filled in to the right), the name of the article, such as "Haag," the model number, the in or out date, and the name of the person checking the machine in or out.

Then follows "in and out" information. In checking in, the card provides for noting where checked in from, as warehouse, who checked it in, the condition, and by whom this condition was verified.

When used as an "out" card by the salesman, the card provides for stating to whom the machine is to be demonstrated, her address, and the condition of the machine. If there is a scratch or any other defection on the machine, he has the condition verified and noted on the card before taking out the machine, for otherwise the defection will be charged against his salary check. The salesman's signature completes the "out" data on the card.

The clerk in charge of the sales desk receives these "in" or "out" cards as they are made out during the day. A letter box arrangement has been found the most convenient—that is, all "in" or "out" are simply dropped into a box with a slit. An "in" card proceeds directly to the card file, according to serial number segregation. An "out" card necessarily follows a more complicated procedure, for in that case there is the charge of a machine to be made against a particular salesman.

An "out" card is placed in a visible file, under the name of the salesman making the demonstration, and the presence of the card in this file really constitutes a charge for the machine against the respective salesman. All reports of calls completed come to this same desk, so that no transferring of information or back-tracking is necessary in order to determine the disposition of the card. The control feature is in the "in" card, which must come through, filled in by the shop foreman or other receiving unit, before the salesman is cleared of his responsibility for the demonstrator.

When an "in" or an "out" card is completed, it is filed numerically, or by serial number. A machine demonstrated a number of times will have a number of cards to reveal its history—telling how many times it has been demonstrated, who has had it out, to whom it has been demonstrated. A machine that has never been demonstrated is just as concisely revealed in that light by the absence of the "out" cards. A final "out" card is made out when the machine is sold, with data as to whom sold, and if the machine reverts, an "in" card is compiled, beginning the cycle all over again. But always all "historical facts" concerning a machine are concentrated in one place—in the card file, segregated according to serial numbers. Such a concentration is impossible with the usual registers.

This system does not abolish the regulation stock register, necessarily recording the entrance of stock by date, rather than by serial number. However, it does not attempt to conform this non-flexible record to the action picture of each machine. That mission is left to the card file, with a card covering every "act" making up the history of a machine. When it is necessary to take a mark-down on a demonstrator, this file has the facts to determine the cut; this file also indelibly stamps the revert as such; this file tells when the machine has spick-and-span factory newness. Guesswork is banished; no painstaking genealogist is required to give the historical facts.

And lost, strayed or stolen machines do not mar the surface of the sales routine when this system is in daily harness, keeping track of every machine that goes out for demonstration and making sure that every machine is either sold or returned to stock.

# By the Carton Vs. Single Sales

**An Actual Argument That Was Carried To a Logical Conclusion**

PETE isn't his name but it will do. Seated by his side at a League meeting was another contractor-dealer. Friendly competitors they were in a fair-sized city. Both enjoy a good store trade. Their establishments are on main traveled streets. Both have customers who habitually buy from them.

Both sell Mazda lamps, of course.

"I never sell a carton if I can help it," said Pete. "Me for the individual lamp sales. I should be giving away 10 per cent of my one staple item of merchandise."

"That's funny, I always figured it was best to sell by the carton, and be sure you had the sale of that many more lamps," said his dinner neighbor, who shall be called "Bill" here for purposes of disguise.

"Can't see it that way," returned Pete. "That's O.K. for the lamp company but look where it leaves me.

"One of my good customers comes in for a lamp. I sell him the one lamp he asks for. When he needs another he'll be back to me to buy another. I sell both at full list and get my profit. Gawd knows, with the price of lamps down to where they are today, that's not much."

"That's all right, Pete, except how do you know your customer will come back to you for the next lamp? I figure that I'm better off to sell him a carton. Chances are he needs more than one lamp anyway. Then he has some spares on hand in case one burns out," came from Bill.

"How do I know they'll come back? I'm talking about my regular customers, the fellows who buy everything from me. With the casuals who come in, of course I try to sell them a carton. I may never see them again," countered Pete.

"But what I mean is I figure that if a fellow is my regular customer he's entitled to that discount and the convenience of some spare lamps. You don't want to use your friends for suckers, do you?" asked Bill.

"Of course not," put in Pete. "But you don't get me. The regular customer doesn't want any more than the one lamp. I'm not trying to load them up every time they come in. And here's another reason. Almost every time they do come in they see something else they want, a socket, or a fuse, or a two-way plug or a roll of tape. The more times they come in the oftener they take up some little accessory they wouldn't come in for by itself. Once in a while they see an appliance and I get a chance to sell it. Seeing it on my display table reminds them they need it. I want them coming in often."

"There's a lot in that," said Bill.

"You're tootin', there is. The profit from lamps is very small. And then to go and give away 10 per cent of it on a carton lot and keep your customer from coming back so you can sell him the other stuff he needs is just plain poor business." Pete was very emphatic.

Bill ate a few mouthfuls of the usual emaciated chicken one gets at industry dinners like this, and then came back:

"What you say is all true, Pete. But just think this idea over. Your customer comes in and gets one lamp."

"Yup," emerged from Pete between mouthfuls.

"He goes home and uses it. Suppose another lamp burns out. Usually they go at night, don't they? If he's got company coming or it's some emergency, he needs it replaced right away. Or maybe the wife is impatient and tells him to go out and get a lamp. 'Can't,' he says, 'stores aren't open until tomorrow.' 'Is that so, smarty,' she answers. 'Just run around the corner to the chain store, it's open until 9 o'clock. Or the drug store—it's open till 10 or 11.' You see, Pete, we electrical stores aren't the only ones selling lamps anymore."

"Don't I know it?" indignantly Pete broke in. "The way my good lamp business has been taken away by those pirates these last few years, I wonder if I'm going to even stock them much longer. Why it's a dirty shame this business is getting away from us electrical stores . . . ."

Bill interrupted. "Let me finish. I think this is the reason, at that. Your good customer goes to the chain or drug store to get that lamp you ought to have sold him in a carton. Those stores took on lamps because people came in after the electrical stores had closed and asked if they had any lamps. Folks didn't want to wait until morning for a lamp. And they hadn't been sold a carton."

"I get you," said Pete. "We've been letting these birds get set up strong in the lamp business. That's what has eaten our trade away from us."

"Worst part of it," added Bill, "is that those chain groceries and drug stores don't give a hoot what kind of lamps they sell your customers. They don't try to sell the right voltage lamp, or even Mazdas. They'd sooner sell a cut-price Jap lamp that is over-voltage and burns half as long, even if it does cheat your customer out of the light he's paying for.

"I heard a test had been made not long ago between the Mazda and some Jap lamps. The store that sells one of the cut-price lamps ought to give every customer a dollar with every lamp, to pay him back for what he's going to be cheated in light for the amount of electricity it will use."

"I'm selling cartons from now on," said Pete. And then the speeches, which weren't half as interesting or important from the standpoint of real benefit as this little argument between two real dealers had been, went on. In fact these byproducts of exchanged experiences are often the most valuable part of meetings of electrical men.

▼

# Make the Law of Averages Produce More Sales

"ANYONE entering this store tends to wander down the aisles, seeing avenues of beautiful lamps and colorful shades, so the very law of averages, if nothing else, would cause an increase in sales when 1,500 people, one at a time, are brought into the store during the year —not only brought in, but accommodated."

This explains the theory by which W. L. Moore, manager of the Dear Electric Co., at Alhambra, Calif., has increased the sale of electric goods in his store. "We have a thousand and one little things that cannot be purchased anywhere else in town," he says, "and we guarantee to repair anything except a watch or an automobile,

providing that by doing so we do not place ourselves in direct competition with a specialized trade represented in our city. This idea has, during the past year, made no less than 1,500 contacts for us and most of our visitors become customers. Lamps and lamp shades are our biggest sellers.

"We have a small quantity of every size and kind of screw that any person is apt to need for small jobs, the sizes that cannot be obtained in any other store in town. We have them both of iron and of brass, round heads and flat heads, every length and every diameter as well as every size of thread. We find the people who have tinkering and experimenting hobbies come here knowing that they can get what they want, and for repair work of all kinds our screw case is popular. Even the hardware stores send people here in large numbers.

"We also carry both copper and brass bars and copper and brass sheet metal, the bars being carried in the various sizes seldom found in regular hardware and variety stores. People with a knack for building toys, people making models for patent applications, need this material and are glad to know where it can be found.

"We have fuses for every type of coffee percolator, a great many of these having been salvaged. Some have been in stock for a long time, but we are glad to have them for they complete the group and some day they will be exactly the kinds needed by certain individuals who cannot find them elsewhere.

"Pure copper tacks are another item. These are used chiefly in building boats, aquariums, and other articles where water comes in contact with metal.

"We keep a nice little stock of driving pulleys for small motors, pulleys ranging from 2 in. to 5 in. in diameter, with various sizes of bores for the shafts. We have them with both grooved and smooth faces. These little pulleys can be obtained no place else in town.

"These peculiar services bring 1,500 people into the store each year, and I am sure it would cost considerable in newspaper advertising space to bring that many people in through the front door.

"There is a good deal of fine publicity in having people say, 'Go to Dear's, they will have it!', or 'Go to Dear's, they can fix it!' Those expressions are in the air in Alhambra.

"I am sure we are among the top few in volume of electric lamp and shade sales in our city and contacts made through the services mentioned are in a reasonable measure responsible."

▽ ▽ ▽

# Last Call!

## Name Contest Ends This Month

THIS is your last chance to enter the Pacific Coast Electrical Bureau—ELECTRICAL WEST name contest and perhaps win the $100 prize, because the contest closes at 12 midnight, May 31. And this is the last story about the rules, because the July issue of ELECTRICAL WEST will contain the name that won the prize and the name of the lucky person who sent it in. Better get out the pen and paper now and begin warming up.

All you have to do is this: Think of the best word describing the advantages of electric heat, a word that can be used in place of "electric heat" in advertising and selling that service to the public. Then send it in to CONTEST EDITOR, ELECTRICAL WEST, 883 Mission St., San Francisco, Calif. If it is the best name submitted, in the opinion of the judges, you will be famous, besides being wealthier to the extent of $100.

Here are some of the advantages of electric heat which are most important to the consumer: Safety, economy, cleanliness, healthfulness, flexibility. Keep your suggestion short, no longer than two syllables if possible, because a premium is placed upon shortness. The name should be one which will fairly roll off the tongue of the salesman and it should be so clear that any layman will know what it means. Sounds like a big assignment for one little word, but it's possible. Lots of the names already received are mighty good.

It isn't necessary to have "electric" or "heat" as part of your suggestion. Go as far away as you like, just so the name meets the other requirements. And the suggestion doesn't have to be one word, although it might be best to condense it to cut down the length.

Don't be afraid to send in a big list of suggestions. And don't be afraid to send in more names if you have already sent in some. The more names you think of, the better chance you have of walking around in June with a new $100 bill in your pocket. One contestant sent in 56 names at once.

Maybe the dictionary will help. You may find just the right prefix or suffix to make your suggestion a winner. And an hour spent in winning a prize like this is an hour well spent.

Just because many names have been entered, don't hesitate to send in your entry. You may have thought of just the name the judges want. And it is all the more credit to you if your idea does win. It doesn't cost a penny to try.

Send in your list now, so you will be sure it is received. Everyone can't win a prize, so here's good luck to you!

RULES

1. *Names submitted should be short (preferably of not more than two syllables) but any name is eligible if it meets other qualifications imposed.*
2. *Suggested names must be printed in ink or typewritten on one side of the paper. Name, address and occupation of contestant must be written on reverse side of the page. All entries are to remain the property of the Pacific Coast Electrical Bureau.*
3. *Entries must be postmarked prior to midnight May 31, 1932, to be eligible. Suggestions will not be considered as valid entries unless received by the sponsors.*
4. *All entries must be addressed to CONTEST EDITOR, ELECTRICAL WEST, 883 Mission St., San Francisco, Calif., U.S.A.*
5. *Anyone is eligible to submit suggested names except the judges and families of the judges.*
6. *Judges will be the Board of Directors, Pacific Coast Electrical Bureau.*
7. *Decision of the judges will be final.*
8. *Duplicate awards will be made if the winning name is duplicated.*

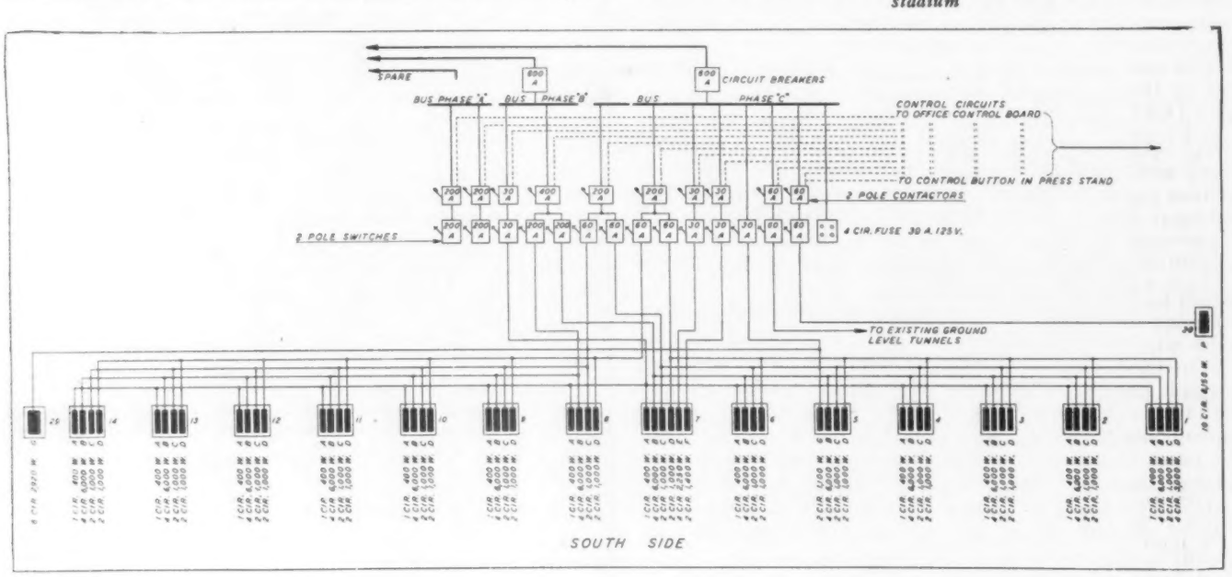
*Architects objected to usual towers and banked floodlights, wanted symmetry, were given 56 standards, 35 to 40 ft. apart, around the stadium. Tests show average playing field intensity of 12 foot-candles, at 10 per cent over-voltage 16 foot-candles*

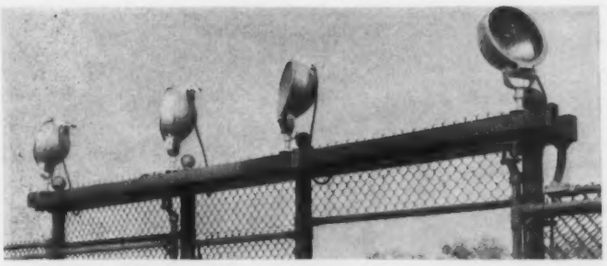
# Lighted for The Olympiad

ORIGINALLY built in 1922, with 80,000 seats, half concrete, half wood, the Los Angeles Coliseum was renamed Olympic Stadium when the Olympic games were awarded Los Angeles, its wooden portion was removed and the structure carried upward in concrete to seat now 120,000 people, provide concession facilities, lavatories, two hospitals, athletic quarters and storage facilities.

Foulkes Electric Co., Los Angeles contractor, designed and installed both the orginal electrical installation and the new for John and Donald B. Parkinson, architects, and L. E. Dixon Co., general contractor. Executive offices, control room for lighting and a public address system are housed in the south of two pylon buildings flanking the peristyle. Pimary disconnects and meters are located in a three-story building west of the stadium. A primary feeder system in duct circles the field. Six manhole locations connect to positions for temporary high-tension motor-generator sets for use in spectacles such as pageants. Feeders run from these manholes to three transformer vaults. The first is in the basement of the office

*Schematic diagram of wiring control for one side of the stadium*





*Four of the 24 500-watt units used to light the peristyle and pylon buildings, mounted on the front entrance gates; others on the buildings light the entrance area*

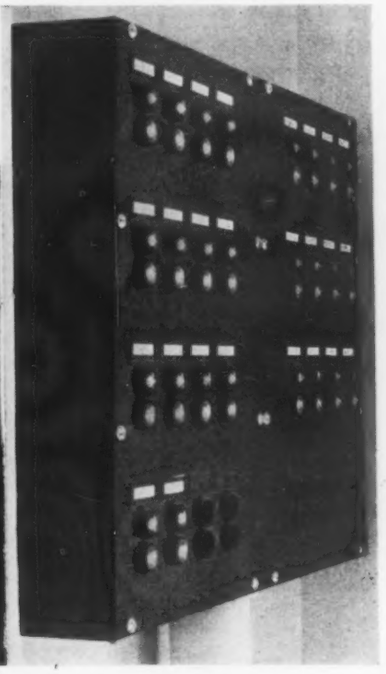
pylon building, supplying current to peristyle, lavatories, ticket booths and athletes' building.

A transformer vault on each side, at concourse level, feeds to lighting units around the top rim of the bowl, as shown in pictures and diagram. All units are controlled remotely from the office building. Lighting units are supported on pipe, anchored to the concrete reinforcing rods. There are in all 112 street lighting units and 84 louvered floodlights trained on the field, 42 on each side.

Facilities for additional spectacle lighting, radio or signal systems are provided in six 3-in. fiber ducts in concrete, feeding through three manholes, one under the surface in the center of the field, and one on each side of the central area. From the center manhole six 2-in. ducts extend to extremes of the central area, terminating in manholes. Thus any facility required may be served anywhere in the field or in the stadium itself. Automatic sump pumps empty the cistern into which the field is drained by porous underground ducts. The total connected load in lighting exceeds 280 kw. Additional power can be brought in for special events. Facilities for future transformers, switchboard and control-button installations have been made in the original job.

*Used also as flagpoles and lavatory vents, 5-in. pipes extend 18 ft. above Stadium upper rail. Atop are 3-in. pipe crossarms with 2 1,500-watt floodlights and 2 500-watt street lighting units apiece, the latter providing general lighting of stands and adjacent grounds*

*Below—Control panel adjacent to a window giving full view of the field in the south pylon office building. The operator may control any desired portion of the lighting independent of other lighting*



*Below—A transformer vault, with room for future additions; beyond the oil switch is the remotely controlled switchboard in another room*

# The Whole Industry Makes a Sale

**Each Branch of the Electrical Craft Had a Part in Converting the Sunset Tower Apartments Into an All-Electric Building, Even in the Face of Real Competition From Other Fuels and Equipment, With the Result That Electricity Has a Monument, and Convincing Data Have Been Obtained to Make Further Selling Easier**

*By* H. H. DOUGLAS
Electrical Heating Engineer,
Southern California Edison Co. Ltd.

*"Dedicated to cooperative selling" well could be electricity's inscription on Hollywood's Sunset Tower Apartments, pictured here*

EXTREMELY modernistic in motif throughout its sixteen stories of reinforced concrete, the Sunset Tower Apartments, built in 1931, is southern California's latest all-electric apartment building. Situated on a knoll with a commanding view and close to the center of Hollywood, it caters to a high type of clientele at a profitable rental scale.

Garage space occupies the first two floors and the third is given to two apartments with servant quarters in the rear. The main entrance, lobby and four apartments occupy the fourth floor and all space above this is for apartments of varying sizes, 41 in all.

Not only are the apartments now all-electric, with heaters, ranges, elevators, ventilators, refrigerators and many smaller electric conveniences, but the building fully complies with Red Seal specifications. It has a total of 740 convenience outlets, practically double the number originally planned, with a connected load which includes:

| | | Kw. |
|---|---|---|
| 180 | Air heaters | 456.5 |
| 39 | Ranges | 332.6 |
| 2 | Elevators (40 hp.) | 29.7 |
| 7½ | Hp. garage ventilation | 5.6 |
| 39 | Refrigerators | 5.7 |
| 39 | ⅛-hp. kitchen ventilators | 4.8 |
| 129 | Kw. lighting | 129.0 |
| 740 | Convenience outlets | |
| | Total connected load (excluding small appliances) | 963.9 |

But it was not an easy job to sell this load, because original plans for the building called for steam heat, gas ranges, and multiple-unit refrigeration. It was converted to electric cookery, electric heating and individual electric refrigeration in the face of very heavy competition from steam equipment distributors and steam interests and was sold on a basis of engineering economics only after the most thorough consideration of all features involved. Those who are really responsible for the present building are William I. Moffett, owner and operator; Leland A. Bryant, architect; Nina Louise Zwebell, interior decorator; William Purdue, consulting engineer; Bennett Taylor Electric Co., electrical contractors; and Merrill Cooper Co., general contractors.

The competitive steam heating job, to take care of the 350,000 cu.ft. of space to be heated, had been reduced to 117 radiators, 3,144 sq.ft. of radiation, equivalent to only 220 kw. of electric heat. But because the modernistic design utilizes large glass areas in decorative relief, with some 12,000 sq.ft. or 30 per cent of the wall area in glass, heating is a real problem. The unusually severe weather of last winter is convincing proof that the proposed steam heating would have been entirely inadequate.

The electric heating installation—consisting of 180 heaters, 456½ kw.—is equivalent to 6,400 sq.ft. of steam radiation or approximately twice the capacity proposed by the gas company engineers, and was made at a price which compares very favorably with the cost of equivalent capacity steam heating.

At the time the job was sold, a comparative cost analysis was made to convince the owners that electric heating was more economical and satisfactory if equivalent results were to be obtained. A transcript of this study is presented here for the purpose of outlining a method which has proved effective in selling the economy of electric heating. The installation as made was slightly less in capacity than shown by this study and an arbitrary figure of 4,500 sq.ft. of steam was used; however, we are convinced this would have been insufficient to handle the requirements on even a moderately cold day. It is, however, 50 per cent more than the gas company proposed to install. (A client may think that some of these estimated costs are not justified, but just ask him to fill in his own estimates of what he considers a fair amount for the different items and you will find him in many cases selling himself on the economy of electric heating.)

Electric service is furnished by the Southern California Edison Co. Ltd. through a 4,000-volt, 3-phase primary brought in underground to the transformer vault on the second floor. A primary oil switch and primary disconnect are located in the transformer vault in such a manner as to permit the operating handles to be mounted on the outer walls in a readily accessible location at the meter panels. (See illustration.) A 300-kva. transformer furnishes 3-phase, 4-wire secondary service at 120/208 volts with grounded neutral. Space has also been provided for an additional unit if it should be required. There was much difference of opinion as to probable demand on this transformer, but last winter's use has shown the capacity

**In a letter to one of the editors, and not intended for publication, Mr. Douglas wrote of that which, more than anything else, makes possible such monuments as this. He said:**

**"We sincerely and deeply appreciate the wonderful cooperation we have had from manufacturers, jobbers, engineers and contractors on this project, and are fully convinced no one of us alone could have overcome the many obstacles in the path of complete electrification . . . . It is with this thought in mind that we feel we owe a debt of deep gratitude to the industry and trust that you may in some way acknowledge for us our appreciation for what they have all done to make this project possible."**

to be adequate for any conditions to be reasonably expected.

Being tall, the building lends itself readily to the use of the vertical riser system, which was installed for secondary distribution. An unusual innovation was adopted, that of using copper tubes as conductors instead of insulated rubber covered conductors in iron conduit. This service consists of three 2-in. and one 1-in. (neutral) extra-heavy copper tubes, each suspended from the fourteenth floor by a ¾-in. "U" clevis and insulated from the 8-in. supporting I-beam by heavy porcelain strain insulators. They are carried up the building in a concrete riser shaft, insulated by micarta tubes where passing through floor slabs, with a 2-in. concrete barrier wall separating adjacent tubes. They are so displaced as to permit a minimum of 2-in. air space between all conductors and all concrete.

Each tube is 120 ft. long, being built in 12-ft. sections, has a cross-section of approximately 2,000,000-circ.mil, weighs about 800 lb., has a rated carrying capacity of nearly 1,500 amp., and is connected by shouldered copper plugs, shrunk, tinned and pinned to practically original tube strength.

Original plans were for the transformer vault to be directly below this riser shaft with the lower end of the tubes connected to flexible leads on transformer terminals. However, it later was found desirable to shift the location of the vault approximately 25 ft. west, making it necessary to run the feeders across the ceiling of the second-floor garage. This was done by cutting the tubes through a 90-deg. conversion clamp to three flat horizontal buses, consisting of two pieces each of 3-in.x¼-in. busbar in parallel, and one piece of the 3x¼-in. for the neutral. They are suspended from the under side of the third floor slab by a micarta insulation block, arranged between two concrete beams and protected from below by a heavy steel panel attached to the side members.

**Comparative Summary—Estimated Annual Costs of Heating Sunset Tower Apartments—Sunset, DeLongpre and Kings Rd., West Hollywood, California**

**Estimated Installation Costs—Heating Approximately 350,000 cu.ft.—41 Apartments, Public Space and Servants' Quarters**

1. Vacuum Steam System: 4,500 sq.ft.—$18,000 (equivalent to only 315 kw. of electric heating).
2. Electric Heating: 526 kw.—$11,000 (equivalent in capacity to approximately 7,500 sq.ft. of steam radiation).

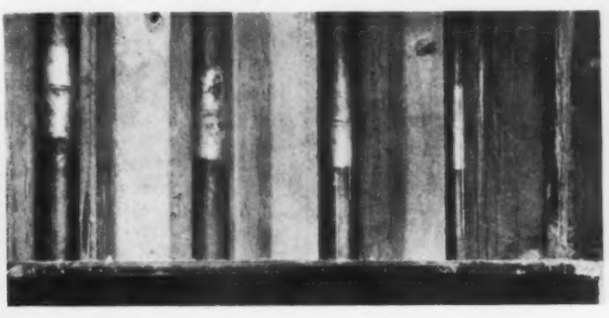
Net saving on investment because of electric heating—$7,000.

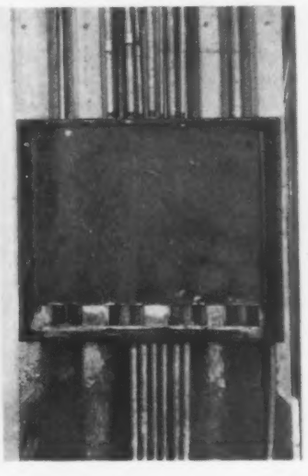
| Annual Cost Items | Steam Heating | Electric Heating |
|---|---|---|
| *Overhead Charges* | | |
| 1. Interest on investment @7% | $ 1,260 | $ 770 |
| 2. Depreciation—steam 8%, electric 3% | 1,440 | 330 |
| 3. Obsolescence | More | Less |
| 4. Taxes (50% valuation@$4.17 rate) | 375 | 229 |
| 5. Fire insurance (90% for steam, 50% for electricity) @30c. on $500,000 | 1,350 | 750 |
| 6. Administration charges | 500 | 200 |
| 7. Boiler insurance (explosion and indemnity on personal and property damages) | 300 | None |
| Sub totals—overhead charges | $ 5,225 | $2,270 |
| *Operation and Maintenance Charges* | | |
| 1. Purchased fuel | $ 1,130 | $3,400 |
| 2. Operating labor | 2,400 | None |
| 3. Operating materials and supplies | 200 | None |
| 4. Maintenance labor | 300 | 100 |
| 5. Maintenance materials and supplies | 100 | 25 |
| 6. Cost of boiler room power and lights | 120 | None |
| 7. Boiler permits, license inspection, etc. | 50 | None |
| 8. Compensation insurance for workmen (1% of labor payroll, item B-2) | 24 | None |
| Sub totals—operation and maintenance charges | $4,324 | $3,525 |
| *Miscellaneous Unclassified Charges* | | |
| 1. Floor space charge for 218 radiators@2 sq.ft. each@20c per sq.ft. per month | $ 1,046 | None |
| 2. Costs of cleaning and decorating due to type of fuel used | More | Less |
| 3. General trend of fuel costs | Increasing | Decreasing |
| Sub totals—miscallaneous charges | $ 1,046 | |
| Grand totals—annual costs | $10,595 | $5,804 |
| Economy of electric heating | | $4,791 |

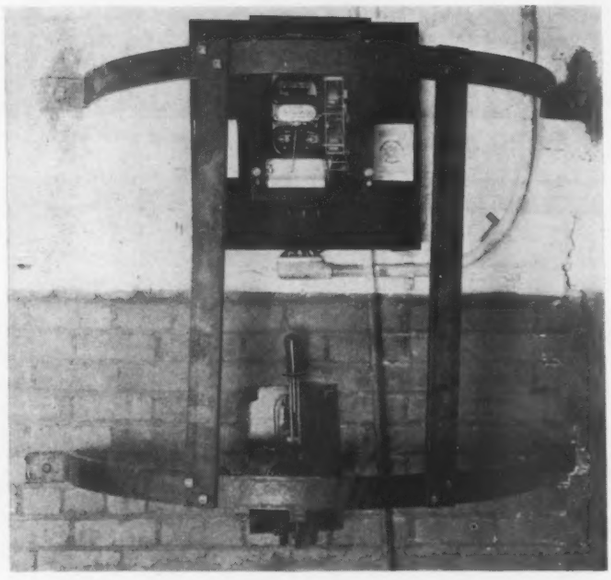
Insulators and bases on the flat buses are arranged so as to permit any slight, though necessary, movement of the lower end of the tubes due to expansion from temperature changes. Careful check has shown these changes negligible because when the heavy current densities exist, the cooling effect in the riser shaft also is greatest. The design and arrangement, however, has

*Below — Strain insulators support the copper tubes which act as conductors, each tube recessed in a concrete vertical runway*

*Below—Showing method of welding copper tube conductors as they pass behind a panel board. Right—Another view of same board with conduit entered. Note manner in which the riser shaft is covered below box, and the opening in lower part of box for tapping*







*Recording meter and main switch. Red Seal emblems have been placed on the meter panel*

been such as to permit a variation of 1 in. in length without introducing any dangerous strain. This variation would require a temperature exchange of approximately 75 deg. F.; observed variation in temperatures have been less than 20 deg. F. and observed departures from normal length less than 0.2 in. The observed maximum voltage drop under maximum loads from transformer to the upper terminals of the tubes on the fourteenth floor has never exceeded 1 volt.

Each floor up to the fourteenth has its own distribution panel, but all circuits above this point are run out of panel 14. Four 4/0 flexible rubber-covered taps are taken off the tubes through lugs, fitted, sweated, and bolted, and are carried into each panelboard. A typical panelboard would contain four 4-wire range circuits, 120/208 volts; eight 208-volt heating circuits; and twelve 120-volt lighting circuits.

Voltage to ground being less than 150 volts, plug fuses are used instead of cartridge fuses on branch circuits. Note also that the ranges are 4-wire, with all 3-phase legs and neutral running directly into the range. The re-arranging of this wiring was done by the electrical contractor on the job.

In addition to service breakers and branch cutouts, these distribution panels carry the magnetic switches which are a part of the remote control system on the heaters. Each apartment's heat is under remote control switches from the office with indicating pilot lamp on remote panel to indicate when heat is being used.

All distribution panels form a portion of the front for the riser shaft housing the copper tubes, with heavy steel above the panelboards to afford ample protection and prevent any possibility of unauthorized or accidental contact.

Installed on the secondary service is a 3-phase, 4-wire, 120/208-volt graphic recording watthour meter with test lugs installed on the main buses inside the vault so that the meter may be tested or disconnected without interrupting the service. Three current transformers with 800:5 ratio are used in connection with this meter.

(EDITOR'S NOTE—Space requirements necessitate the division of this story into two parts. The first is presented herewith, and the second part, containing operating data, tests, cost comparisons and cash register value of such cooperative selling, will be presented next month.)

# Do Contractors Want Impartial Inspection?

*By* WALTER B. FORD
Former Electrical Inspector

DO ELECTRICAL contractors desire a fair and impartial inspection of their wiring installations? Placing that question before a group or association of electrical contractors undoubtedly would result in an affirmative answer, yet the individual contractor often gives the impression that the inspection of his own particular job should be anything but impartial.

The provisions of most electrical ordinances are simply stated and to the point, and are capable of but one correct interpretation; yet I know of many occasions where the contractor has "shopped" around from inspector to inspector, and finally has gone to the chief inspector, hoping to get a different interpretation of some point that was clearly stated in simple English. The electrical contractors, through their associations, have ample opportunity to express themselves with regard to proposed provisions of new electrical ordinances before their adoption. If any undesirable features exist, they should be eliminated at that time.

Inspection of electrical installations is considered by many laymen to be an unnecessary evil which stands in the way of obtaining prompt electrical service. This feeling undoubtedly arises from the fact that the contractor tells his client that "service may be obtained just as soon as the job is inspected" rather than that "service may be obtained just as soon as the job has passed the inspection." If the job is held up because of changes to be made in the wiring, the inspector gets the blame. If the contractor emphasized the safety factor of electrical installations and then necessity for proper inspection, there probably would be less chance of the "handy-man" attempting to encroach upon the contractor's field.

Since all human beings are prone to make mistakes, many jobs do not pass inspection when the inspector makes his first call, which necessitates a second and possibly a third trip. While corrections or changes in the wiring are costly to the contractor, they are equally costly to the inspection department. The fees usually provide for two inspections, so it is obvious that where only one inspection is necessary, a saving is made for the department.

Some contractors consider requests for changes in their wiring installations, when made by the inspector, as a personal matter and act accordingly. Occasionally, their reaction is to file absurd charges against the inspector, in the hope that he will lose his position. In one incident of such a nature the inspector, after having inspected a fixture installation and having found unsoldered joints, left the canopies of the fixtures down so that the unsoldered joints could be located. Several days later he was somewhat chagrined to find that the contractor had preferred charges against him in which the inspector was accused of tearing the fixtures from the walls and ceilings. To clear the matter up it was necessary to obtain the owner's affidavit that the charges were untrue. All of which resulted in considerable loss of time and forever eliminated the possibility of the contractor doing any future work for that owner.

Much has been said and written for and against the licensing of wiremen. Without attempting to decide the issue, I may say without fear of contradiction that the adoption of such a measure would go a long way toward

eliminating the "five-and-ten-cent store" wireman. Some supply houses not only sell materials, but supply instruction as to how the material should be installed. In some cases the customer is advised that a permit and inspection are necessary, although no mention is made of this fact in some of the stores.

An amusing incident with regard to this came to the author's attention recently. In a store located in a city where conduit installations only are allowed, a salesman, after selling a customer a complete list of supplies for a knob-and-tube job, was overheard telling the customer that it was necessary to get a permit before doing the job; also, how and where to get the permit. It isn't known how the prospective wireman fared, but if he reached the inspector's office there probably is one less worker in the "wire-your-own-home" field.

Every legitimate contractor realizes the importance of maintaining high standards in electrical installations. Not every one, however, realizes that the inspection department makes such standards an actuality. By demanding quality materials and the same grade of workmanship, the inspection department protects two items which otherwise might suffer disastrously under present-day competition.

It is not to be doubted that there are many conscientious electrical contractors whose work would be up to the same standard, whether inspected or not. Perhaps these are the forerunners of the far-distant Utopia where electrical inspectors will be as extinct as the Dodo.

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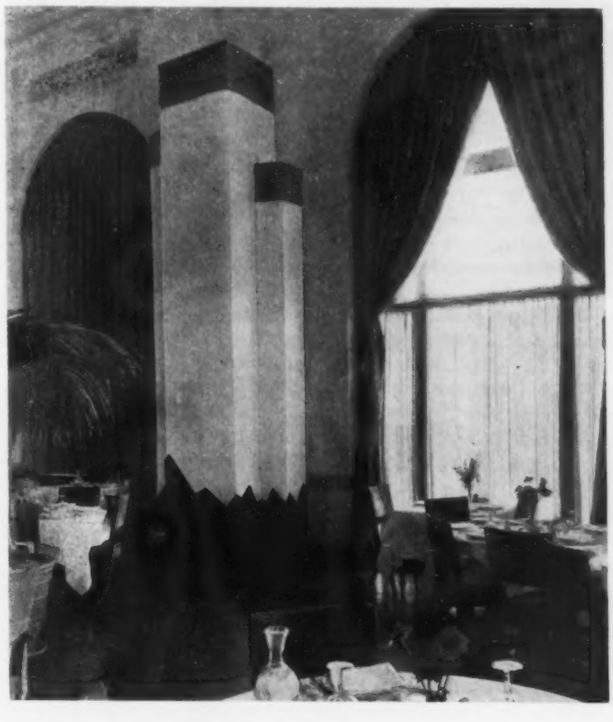
## Light Columns Decorate Dining Room

NOVELTY at small expense was provided in the lighting of the main dining room at the Hotel Del Monte during last year's P.C.E.A. convention. The idea is so simple that it offers possibilities for more extensive use in decorating for special occasions.

In this case eight sets of columns were constructed of light wooden framework covered with a closely woven white silk. Colored cloth was used at the top and bottom for design effect. Inside these columns were mounted Wuelker directive reflectors, which cast a vertical beam of light both in an upward and a downward direction. When lighted, the white columns glared with rich color, changing from one tone at the top to another at the base.

The whole effect was easily assembled and removed.



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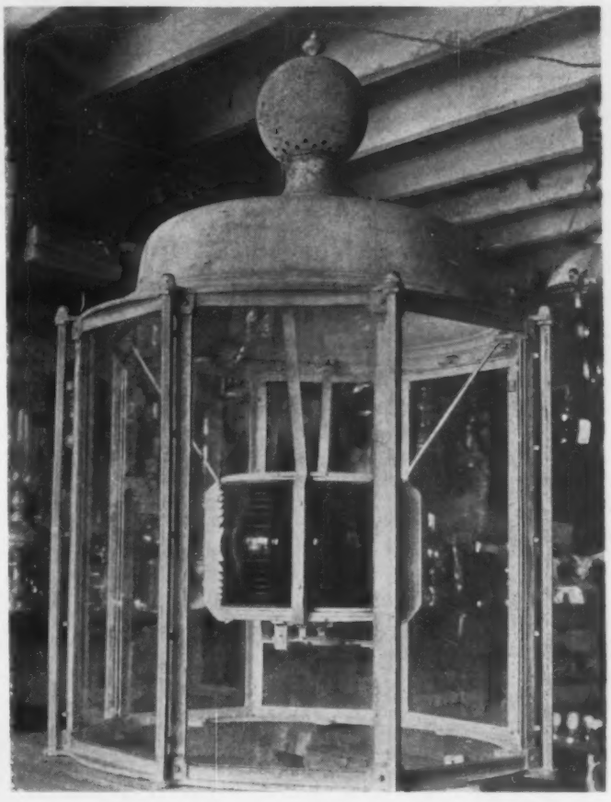
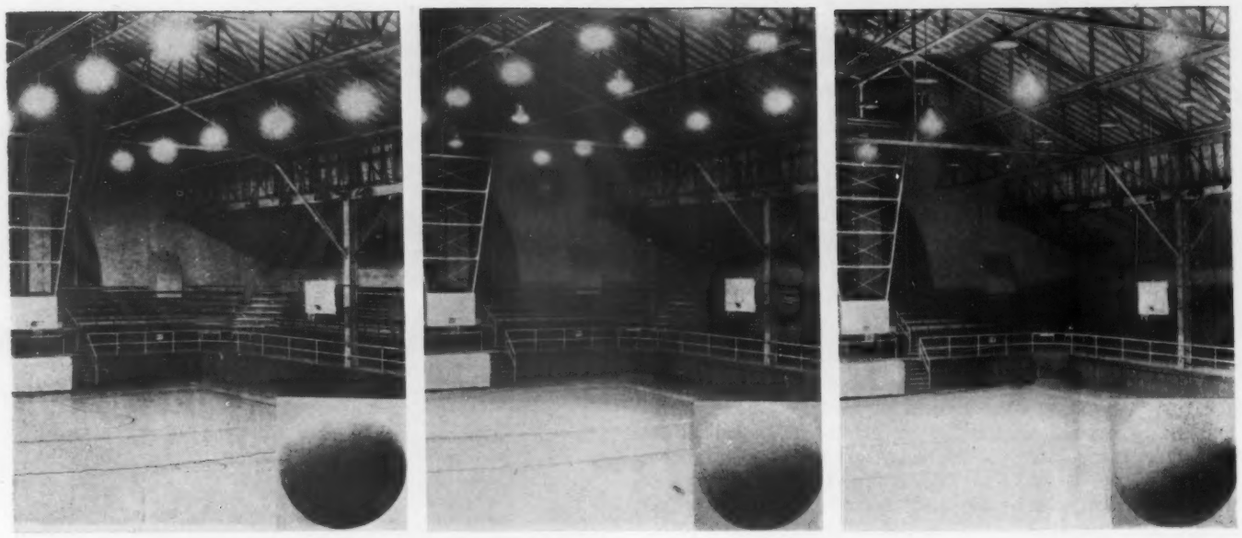
## Old Spanish Lantern Now Electric Beacon



SEVENTY-FIVE years ago oil lamps lighted the lighthouse beacons along this Pacific Coast. They were picturesque lanterns and faithful. When the yacht harbor at San Francisco needed a picturesque lighthouse in keeping with its surroundings of pleasure craft, nothing could be more appropriate than an old Spanish type of lantern, taken from a Humboldt County lighthouse of 75 years ago. Converted to incandescent lighting by Savery Bros., lamp makers since 1882 for the ships of San Francisco Bay, the old lantern now acts as a beacon at the yacht harbor.

It is equipped with automatic lamp-changing mounting, 1000-watt lamps operating on a 220-volt street lighting circuit. A battery standby is provided to operate the lamps in case of line failure, actuated by a relay which throws the lamp over to the battery circuit upon current failure.

This beacon is the first of four contemplated in connection with the million-dollar yacht harbor development to be completed by 1937. The accompanying photograph of the lantern was taken in the Savery Bros. shop, amid hundreds of other ancient and modern lamps of the sea and its vessels, before being fitted with the incandescent lamp equipment.



*Left—Lighting combination No. 1. Note the appearance of the tennis ball in each case and the spread of light over the court and seats. Center—Light combination No. 2. Right —Lighting effect with both high-bay and glassteel units. The ball is more evenly and fully lighted*

# Lighting for Night Sports

**Although the Author Speaks Only of Tennis, the Tests Devised and the Conclusions Drawn Are Applicable, With Modifications, to Other Night Sports and to Industrial Installations**

*By* MARSHALL J. KIMBALL*
Stanford University

NIGHT tennis has not kept pace with the other after-dark sports in growth, accountable in some measure to poor lighting installations and to the cost of adequate court lighting. Yet tennis is far more permanent than miniature golf, minnow fishing and other forms of vacant-lot amusement. Because of the real exercise which the game affords, the inexpensiveness of equipment and the democratic appeal, it is more secure in American sports life and should be one of the most lucrative of night sports for the promoter.

Some common faults in installations have been too low intensity, insufficient mounting height, too much glare, and lack of uniformity of illumination. It is a common practice to sacrifice height to obtain a higher intensity or to sacrifice intensity to obtain sufficient mounting height. Glare and poor distribution are caused mainly by improperly designed reflectors and are common faults where the mounting height is too low.

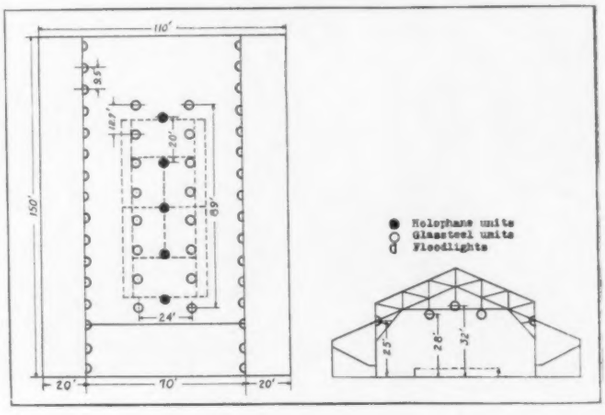
To determine the factors which affect tennis playing at night, one of the tennis courts at Stanford University was equipped for night play and the results watched. Later, to obtain greater flexibility, the basketball pavilion was equipped with the same units and definite tests were made. All work was restricted to overhead systems, but the results obtained will apply to side lighting installations with only slight modifications.

Outdoors, the installation consisted of five prismatic glass high-bay units with 1,500-watt lamps, mounted on a ⅜-in. steel messenger cable at a 32-ft. height and spaced 22 ft. apart. The average intensity was approximately 16 foot-candles. From tests and observations of games played with this illumination, we concluded that a lower mounting height would be unsatisfactory because, even with the units 32 ft. above the court, a high lob often will go above the level of the light. A light-colored court surface probably is better than a dark-colored surface, we found, and a light-colored covering on the back court fences (such as a canvas covering) is desirable to break the contrast between the lighted playing area and the dark background. This contrast was very annoying to the players.

Lighting in the pavilion normally is obtained from sixteen glassteel diffuser units with 500-watt lamps and 36 500-watt floodlights directed onto the ceiling. The five special units were mounted temporarily as shown in the diagram.

Four lighting combinations were used. The first, with

*Arrangement of units in the Stanford pavilion. Floodlights were not used in the tests*




* The investigation herein described was undertaken by the author and the findings were tabulated and written as research work in illuminating engineering. The work is particularly interesting because of the scientific viewpoint achieved through the use of quantitative measurements, as contrasted with the usual method of relying on personal opinions and reactions. As presented, the report has been rewritten and condensed from the original.

only the glassteel units, gave an average intensity over the playing area of 5 foot-candles. The second, with high-bay units alone, gave an average intensity of 14 foot-candles. The third, using both the high-bay and glassteel units, produced a 19-foot-candle average. The fourth was the same as the third, except that the high-bay units were supplied with a voltage boost through an auto-transformer. With this combination the intensity was raised to 30 foot-candles.

In order to determine in a quantitative manner the effect of intensity of light upon the playing ability, this test was devised: A player would make 25 good services and a second player would attempt only to return the ball. A third person kept score of the number of successful service returns. This was repeated until each player had made 50 good services under each of the lighting conditions.

Twenty-nine hundred observations were made in all, with eight players taking part in the tests. Sixteen hundred observations were made using the four lighting combinations in the order named (1, 2, 3, 4) and 1,300 with the combinations in the reverse order (from highest intensity down to the lowest). While there are many variable factors influencing a player's return of a service, it is believed that a sufficient number of observations was made to eliminate the human element almost entirely. The results, shown in the table, are surprisingly consistent and show a definite trend. The accompanying curve shows the percentage of good returns as a function of the foot-candle intensity. It is apparent that there is a maximum above which no great increase in the number of returns will result from increased intensity, the limit being the percentage of returns which would be made under daylight conditions. Of course, expert players like William Tilden III would have a much higher percentage of good returns than the average player.

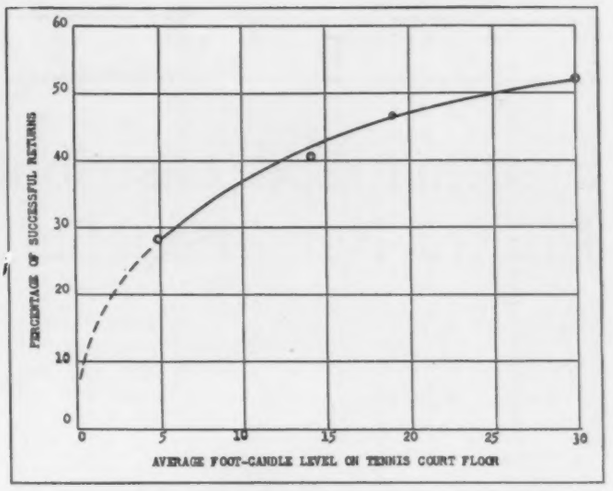
Photographs were made of the tennis ball, suspended by a thread at a height of 5 ft. above the floor and in a typical receiving position relative to the court. With the first light combination the upper quarter only was lighted. With the second combination nearly half the ball is lighted, but the light comes from an angle rather than from the top. With the third, illumination is more nearly normal, with about two-thirds of the ball lighted.

Observations made by the players agree very well with the results of the tests. With glassteel units alone it was definitely difficult to follow the ball in flight. With the high-bay units alone there was no difficulty in seeing the ball at all times. The increase in the number of successful returns, using both high-bay and glassteel units, possibly may be due to increased uniformity as well as to increased intensity.

With the first three combinations the glare was not objectionable even when the balls were lobbed. With the voltage boosted on the high-bay units the glare increased considerably and was objectionable to those playing. Thus it would seem that the attainment of higher levels of illumination should be obtained through the use of a greater number of smaller candle-power units, rather than through a smaller number of higher candle-power units.

While the tests do not cover the field in its entirety, they give a reliable measure of the minimum intensity for reasonably satisfactory night tennis playing. That intensity is from 20 to 30 foot-candles. Uniformity also is essential if the installation is to be satisfactory.

Not only in sports, both indoor and outdoor, but also in industrial installations will the test conclusions hold. Especially in applications where machinery is moving or where there is considerable human action, the results, with some slight modifications, will apply.




*Percentage of successful returns plotted against the foot-candle level of illumination on tennis court floor. The curve summarizes 2,900 observations on eight average tennis players, under the various lighting combinations, over a nine-months period*

**Tabulation of Observations**

| Lighting Combination | Glassteel | | High-bay | | Glassteel + High-bay | | Glassteel+ High-bay+ Boost | |
|---|---|---|---|---|---|---|---|---|
| Obs. order | 1 Serves | Rtns. | 2 Serves | Rtns. | 3 Serves | Rtns. | 4 Serves | Rtns. |
| | 50 | 15 | 50 | 20 | 50 | 28 | 50 | 30 |
| | 50 | 20 | 50 | 27 | 50 | 29 | 50 | 30 |
| | 50 | 18 | 50 | 28 | 50 | 27 | 50 | 30 |
| | 50 | 22 | 50 | 26 | 50 | 28 | 50 | 29 |
| | 50 | 10 | 50 | 20 | 50 | 21 | 50 | 22 |
| | 50 | 14 | 50 | 21 | 50 | 26 | 50 | 26 |
| | 50 | 8 | 50 | 11 | 50 | 15 | 50 | 22 |
| | 50 | 9 | 50 | 24 | 50 | 21 | 50 | 23 |
| Obs. order | 4 | | 3 | | 2 | | 1 | |
| | 50 | 7 | 50 | 16 | 50 | 14 | 50 | 22 |
| | 50 | 11 | 50 | 16 | 50 | 19 | 50 | 28 |
| Obs. order | 3 | | 2 | | 1 | | | |
| | 50 | 16 | 50 | 11 | 50 | 21 | | |
| | 50 | 17 | 50 | 20 | 50 | 24 | | |
| | 50 | 12 | 50 | 22 | 50 | 27 | | |
| | 50 | 14 | 50 | 17 | 50 | 22 | | |
| | 50 | 15 | 50 | 20 | 50 | 25 | | |
| | 50 | 17 | 50 | 26 | 50 | 28 | | |
| Totals... | 800 | 225 | 800 | 325 | 800 | 375 | 500 | 262 |

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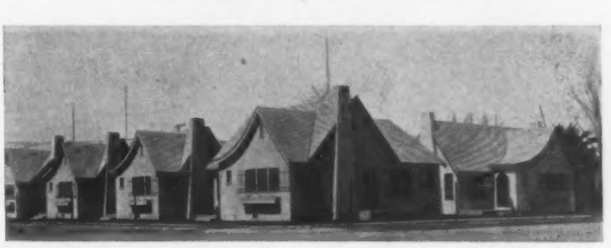
## *A Court of Red Seal*



FOUR single dwellings, and one duplex, all equipped with Red Seal convenience in wiring, form an outstanding residential group in Tulare, Calif. Wiring for the entire group was installed by the Tulare Electric Company.

# Systematized Distribution Effects Rate Benefits

**Efficient Layout of Equipment and Close Supervision of Circuits at Associated Oil's Avon (Calif.) Refinery Results in a Power Factor of 85 and Earns Good Bonuses**

IN COMMON with many industrials, oil refinery electrical service must not be subject to outages of even minimum duration if dangerous hazards to equipment and personnel are to be avoided. Improved cracking and distillation processes requiring high temperatures, high pressures and greatly increased oil flow have made continuous and correct operation of all equipment imperative. Oil stills operate on a 24-hr. basis necessitating continuous operation of associated functions such as supplying the crude, the condensing of gases, transporting the various products for further processing or to storage, pumping for loading on tank cars and vessels and pumping through pipe lines to distant distribution centers.

Illustrating the importance of complete reliability in electrical service is the 10,000 barrels per day cracking unit of the Tube-and-Tank type shown in Fig. 1 and Fig.1a. This unit was recently installed in the Associated Oil Co.'s refinery at Avon, Calif., and is believed to be the largest completed plant of its type in the world. The installation consists of two large furnaces of similar design, reaction chambers, evaporator and fractionating towers and other equipment required for a complete cracking unit.

The control of the entire plant has been centralized to a main panel board in the pump house, where all operating instruments are placed and where all rates of flow, pressure, temperature and the dump valves are controlled by means of suitable thermometers, pressure gages and control switches or valves. Pressures at certain points of the system are controlled by manually operated valves, and levels in the accumulators are maintained with liquid level controls. These levels are relayed to the control room by an electric light system. Thermocouples are placed at various points throughout the system and are all connected to the same indicating instruments on the control panel. At the same points there are also located indicating thermometers which make it possible to obtain all important readings from either of the two instruments serving as a check against each other.

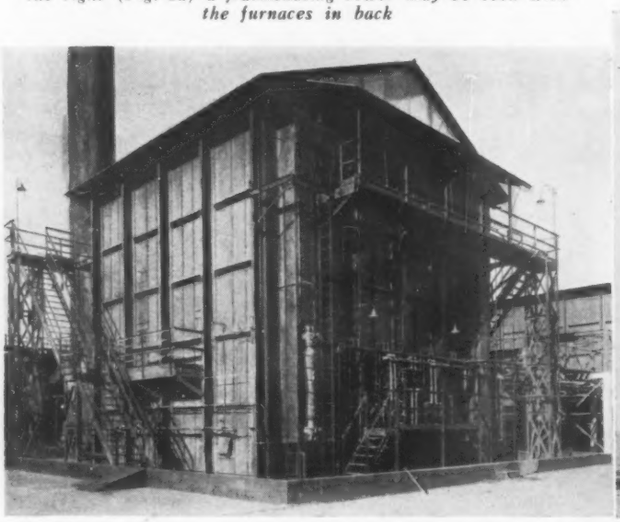
Under the normal system of operation oil temperatures of approximately 600 to 900 deg. F. are maintained with pressures ranging from 800 to 1,200 lb. per square inch.

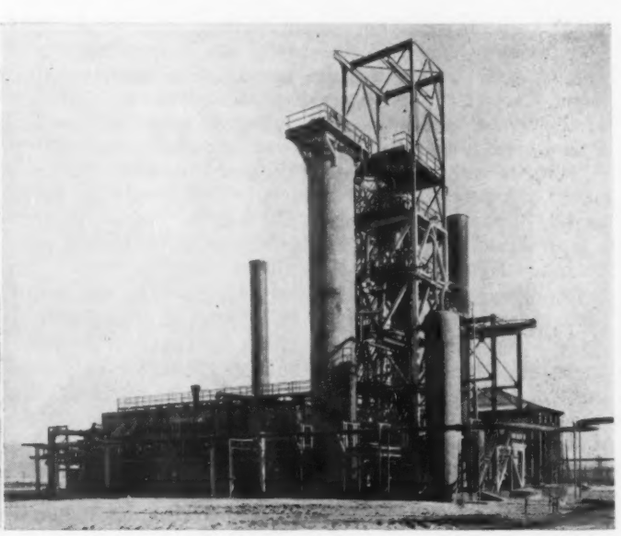
Should an occasion arise such as the rupture of a furnace tube requiring immediate relief from pressure, the contents of the system, or any portion thereof, may be dumped to a blowdown tower, situated about 800 ft. from the unit, by means of motor operated slide-gate air valves placed at strategic points. It is necessary for the operator in the control room to throw only one lever to operate the motor valves, thus relieving the system of hot oil.

This brief description of a portion of the operations may serve to indicate the importance of continuous electrical service in the petroleum industry.

It has not been until recent years that electrical equipment either for power supply or distribution has been considered acceptable or sufficiently reliable for use in industries of this type. Steam-driven apparatus has been used almost exclusively for motive power, and even today many modern refineries insist upon dual drives consisting of an electric motor and a steam turbine for vitally important pumps and equipment. However, with the advent of more reliable motors and control equipment, high-speed circuit breakers and improved relay protection, it is possible to devise power supply and distribution sys-

*Fig. 1 (below)—One of the two new furnaces recently installed by the Associated Oil Co. at its Avon refinery. At the right (Fig. 1a) a fractionating tower may be seen with the furnaces in back*





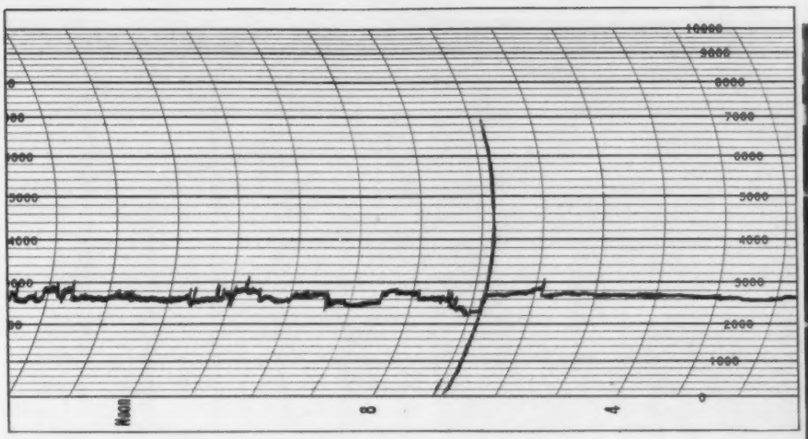



*Fig 2 (above)—A section of the wattmeter record chart for a 15-hr. period. The load is kept practically constant by carefully scheduling various plant operations, thereby artificially creating wide diversity and improving load factor*

*Fig. 3 (right)—Metering section of the switchboard. On the extreme right is one of the eighteen feeder panels showing the watthour meter with its demand attachment with which each panel is equipped*

tems which meet the exacting requirements of this industry.

### Power Supply

The electrification of the Avon refinery dates back to 1918 when the installation consisted of a bank of three 100-kva. transformers. Electrical growth of the plant paralleled its growth in capacity until 1930 when installed capacity reached 10,000 hp. At that time the power supply was provided by a 60-kv. common bus tie between Antioch and Crockett substations of the Pacific Gas and Electric Co. On account of its location approximately half way between Crockett and Antioch, the Avon substation became isolated as a result of disturbances originating either on this tie or in other industrial plants fed from it. Consequently, when the Associated Oil Co. decided upon an expansion which involved the addition of 2,000 hp., a new scheme of supplying power had to be devised if costly interruptions to service were to be avoided. Working in cooperation with the Associated Oil Co. engineers, the Pacific Gas and Electric Co. rearranged its substation at the refinery so as to provide practically 100 per cent continuity of service at that point.

Avon substation is now served by two independent 60-kv. feeders which terminate at oil circuit breakers, from each of which leads are brought to a common bus. Instead of the conventional throw-over relay arrangement by which the load is served from a preferred source and transferred to a standby feeder in case of emergency, the common bus is fed by both feeders at times of normal operation. When trouble occurs on either feeder the circuit breaker trips it off the bus instantly by means of a reverse power relay installation. As the breaker trips it relays an alarm at the telephone headquarters of the plant and the operator there warns operators at key points throughout the plant that only one feeder is in operation and to be ready for an emergency. Thus the load of the plant may be transferred to either feeder with no interruption to service. In Fig. 2 is shown a section of the recording wattmeter chart at the plant, upon which the effect of trouble on one feeder is displayed. The long line across the chart at 6:45 a.m. indicates the time when one feeder went out, but it will be noted that the load remained practically constant, the only effect shown being the dropping of approximately 200 kw. After one of the two feeder circuits has relayed out, automatic throw-over protection is provided, i.e., the relaying out of the remaining feeder causes the first to be reconnected to the bus if service to it has been resumed. Otherwise the second feeder, even though it is not energized, remains on the bus until power is available to one of the feeders. Relays then function to energize the bus, disconnecting the unenergized feeder if necessary.

Reconnection of feeders to the bus is entirely automatic except in the case where the one from Crockett trips out followed by the Antioch breaker. The Antioch breaker comes back automatically but it is necessary to synchronize the Crockett feeder if the Antioch feeder is on the bus.

### Distribution Switchboard

From the 60-kv. bus common to both feeders, leads are taken off to a bank of eight transformers, two sets of three each operating in parallel, the remaining two serving as spares. There power is stepped down to 2,200 volts for plant distribution through the main distribution switchboard. This board is an excellent example of well-planned industrial distribution. It is mounted in a galvanized iron house whose concrete foundation is unusual in that a concrete depressed runway extends longitudinally through its center. On either side of this runway are depressed areaways leading into the underground and overhead system of the plant.

The switchboard is mounted at the floor level and is divided into two sections, half being on each side of the building. The panels making up each half face outward, the rear of each section fronting on the concrete runway previously mentioned. The accompanying photograph of the switchboard shown in Fig. 4 illustrates this type of construction.

Eighteen feeder panels, nine on each side, together with two metering sections, make up the board. On the front of each feeder panel are mounted a recording kilowatt-hour meter with a demand attachment, test receptacle and a manually operated circuit breaker as shown in Fig. 3. The 2,200-volt bus is installed along the top of each section, power being fed in at its center. On the rear of each feeder panel are mounted three latched-in type disconnecting switches, two current transformers and the three-pole, 600-amp. circuit breaker with an interrupting capacity of 15,000 amp. Potential for all of the instruments is taken from two small 2,200/110-volt transformers, thereby eliminating the investment in individual potential transformers for each feeder panel. Circuits are taken from the breakers through potheads into

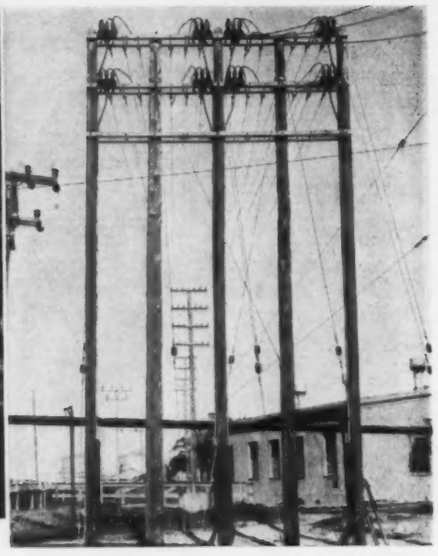


*Fig. 4 (above)—View of the switchboard looking along the center line of the installation. The depressed runway makes all parts easily accessible and areaways on either side provide a convenient way to bring distribution feeders out of the building*

*Fig. 5 (right)—Special pole riser designed for handling twelve circuits, eight of which are now installed. The eight-circuit transmission line may be seen in the background*

three-conductor lead-covered cables which pass on along the wall of the areaway into underground conduits.

As shown, this arrangement has the advantage of being exceptionally accessible for maintenance or repairs. On the rear of each circuit breaker an identifying sign is placed, upon which is inscribed the circuit number, its voltage, size of feeder, current capacity and overload trip setting.

A metering section of two panels is mounted at the end of each half of the switchboard, one section mounting indicating, recording and totalizing instruments for the plant circuits and a similar installation for the utility.

### Distribution

Circuits taken from the distribution switchboard leave the switchhouse via underground tunnels in three general groups, one serving that portion of the refinery which has a complete underground system, a second, the loading and packing plants, and the third connecting with an eight-circuit transmission line extending across the property and serving various process groups. These eight underground circuits are brought to the pole riser structure shown in Fig. 5. This structure consists of two 50-ft. standard poles and three 12x12-in. redwood timbers so arranged that a pole is between each timber. Circuits are brought up the square timbers to potheads for take-off on the transmission line which is shown in the background. The structure, mounting eight circuits, has space for four additional lines. Aside from its neat arrangement and ability to handle a large number of circuits, it has the additional advantage of safety for men who may be called upon to work on it. The poles, which the men climb, carry no live wires or cables, although each circuit is easily accessible from one of the poles. With this arrangement it is not necessary to cover the cables on the timber riser.

The 2,200-volt feeders terminate in distribution centers located at strategic points near load centers in the refinery area. A typical load center which has been developed for this plant is shown. It consists of a small steel framework with hollow tile walls. On top are mounted the 2,200/440-volt power transformers and 2,200/110-volt lighting bank. These transformers are fed underground from the overhead transmission line already described. Low-voltage power circuits enter the building through the top. Within is an angle iron framework placed against the walls which supports the bus gutters feeding individual or group motor circuits. Each circuit is provided with the conventional fused disconnecting switch and contactor. The magnetic control for the larger motors is mounted in banks along the center aisleway, all being remote controlled. Circuits, equipment, and control switches bear numbers for easy identification and the more important motors are provided with a transfer switch arrangement so that in case of a feeder failure within the plant vital operations can be carried on with little delay. Circuits from these distribution centers are carried underground to their respective loads. To facilitate this, the floor of the building is removable, covering a concrete pit from which conduits take off.

These distribution centers provide a compact arrangement of distribution circuits. With power transformers on the roof, safety is promoted and the internal angle iron structure provides an accessible and flexible arrangement facilitating additions, changes or repairs.

### Economics of Distribution

While the mechanics of the distribution system for this industrial are highly interesting, still more so are the

**Monthly Report on Electric Circuits**

| Circuit | Max. Dem. Kw. | Avg. Dem. Kw. | Max. Amp. | Avg. Amp. | Cable | Max. Safe Amp. | Breaker Set Amp. |
|---|---|---|---|---|---|---|---|
| 1 | 250 | 213 | 76 | 61 | 0 | 127 | 300 |
| 2 | 20 | 20 | 6 | 6 | 2 | 100 | 70 |
| 3 | 400 | 260 | 124 | 79 | 0 | 127 | 300 |
| 4 | 430 | 337 | 132 | 103 | 0 | 127 | 300 |
| 5 | 120 | 116 | 36 | 35 | 0 | 127 | 330 |
| 6 | 100 | 84 | 31 | 25 | 2 | 100 | 160 |
| 7 | 260 | 105 | 79 | 32 | 0 | 127 | 360 |
| 8 | 450 | 387 | 138 | 115 | 0000 | 229 | 360 |
| 9 | 240 | 184 | 74 | 56 | 0 | 127 | 300 |
| 10 | 80 | 62 | 24 | 12 | 0 | 127 | 360 |
| 11 | 280 | 270 | 86 | 82 | 00 | 153 | 360 |
| 12 | 620 | 401 | 190 | 124 | 0000 | 229 | 480 |
| 13 | 270 | 150 | 84 | 46 | 0000 | 229 | 480 |
| 14 | 350 | 290 | 108 | 85 | 0 | 127 | 360 |
| 15 | 200 | 173 | 61 | 53 | 0 | 127 | 240 |
| 16 | 190 | 92 | 55 | 19 | 0 | 127 | 200 |
| 17 | 460 | 433 | 142 | 133 | 300,000 | 275 | 360 |
| 18 | 480 | 470 | 149 | 144 | 300,000 | 275 | 360 |
| Pacific Gas and Electric Co. power factor..... | | | | | | 85 | |
| Associated Oil Co. power factor..... | | | | | | 85 | |

This table is made up from the daily analysis of each feeder circuit as recorded by the individual watthour-demand meters. It provides the means by which the most advantageous combination of loads may be determined to give demand and power factor which can be evaluated in a lower rate.

economics involved in supplying the 10,000-hp. connected load. It is important that the maximum demand be kept low and the power factor as high as possible if advantage is to be taken of a low rate for electrical service.

At the Avon refinery, control of electrical demand is under the mechanical superintendent who schedules the operations of the various processes to conform with minimum demand requirements. As an example, such processes as transfer pumping and residuum pumping can be done at times when loading or pipe line pumping is not necessary. In this type of plant definite periods of operations are necessary every 24 hours, making it possible to arrange a particularly advantageous time schedule for all groups, which will keep both the load and the demand practically constant. This is shown in Fig. 2, which graphically illustrates the plant load through the period from midnight to 3 p.m. the following afternoon. The success of this system of electrical loading schedules depends upon a thorough analysis of the relations of demand requirements for the various process groups of the plant and competent supervision to see that these schedules are carried out. That it has been worked out to a high degree at Avon is evinced by the figures for a typical month which show a maximum demand of 3,780 kw. with a monthly average load of 3,140 kw., an exceptionally close control of the 10,000-hp. connected load.

As already described, each of the eighteen feeder circuits is equipped with an individual kilowatt-hour meter with a 15-min. demand attachment. Through the use of this meter a daily analysis of conditions on each feeder is possible. Such an analysis is shown in Table I from which pertinent data on each feeder can be evaluated in its relation to the total load. This close supervision of each feeder makes it possible to correct undesirable loading or demands which may develop, by transferring part of the load to another feeder with a margin of capacity.

Power factor, also under strict observation, is maintained at a high figure by proper sizes of conductors and a careful supervision of individual motors to insure that their horsepower rating conforms closely to the load which they drive. Often these periodic check-ups have revealed economies which might be effected by exchanging motors on various drives. Despite the fact that there is no corrective apparatus at the plant and all motors are of the induction type, it has been possible to arrange the distribution layout to give an over-all power factor which seldom falls below 85. Under the existing rate schedule there is a 0.3 per cent bonus for each point above a power factor of 80. Thus the monthly saving from this one factor ranges between $250 and $300. The Avon plant is an excellent example of an installation where careful layout and close supervision of the electrical circuits result in tangible monthly reductions in operating expense with a minimum investment.

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A Department for the Industrial Electrical Contractor — the Motor Specialist

# MOTOR FORUM

An Exchange of Ideas on Economic Electrical, Mechanical and Business Problems

# Wholesalers As Motor Distributors

**How a Classification of Wholesale Accounts Would Improve Distribution Practice, Perhaps Even Save Wholesaling From Possible Extinction in the Shunting of Goods From Manufacturer to Consumer**

As outlined to the editors

*By* FRANK E. BOYD

Vice-President and General Manager, Pacific Electric Motor Co., Oakland

WHOLESALING has long been the bumper between the producing manufacturer and installing contractor or selling dealer. In the early days of the industry, when transportation and communication were still undeveloped and hence slow, the wholesaler had a very tangible, necessary place in the scheme of distribution. Manufacturers were far away and it was a great convenience, well worth its cost in time and effort saved, for the contractor or the dealer to rely entirely upon the wholesaler for a near-at-hand, ready-for-delivery stock of materials or appliances.

Times have changed rapidly. Branch factories, manufacturers' branch warehouses, swift transportation, customers looking for short cuts—even a growing knowledge of electricity—have brought about a vastly different situation. Just as there are many manufacturers without wholesale outlets who are anxious enough for business to sell direct to the contractor—even to the consumer—so there are wholesalers who sell direct to consumers without batting an eye.

Wholesalers early made the mistake of demanding that manufacturers maintain stocks for them here in the West, not realizing that some day each of these warehouses would be a potential rival for their trade. Their own function as a warehouse of supplies for their customers they gave away for the sake of short-sighted immediate convenience and economy for themselves. This Frankenstein now arises as a monster which may destroy them as an institution.

These may seem unnecessarily hard words. Yet they are the inevitable consequences of a loosened, poorly planned distribution machine. When the wholesaler is tested by the eight customer demands for his fitness to handle the motor business direct, the issue is one of serious consequences to him, since it may mean either becoming a motor dealer actually or—what shall it be?

### THE TEST AGAIN

When it comes to engineering advice on the proper application of the motor or equipment, here, as with the manufacturer, the wholesaler is restricted. If the jobber's salesman is enough of a technical man to give the required engineering advice he is a rare animal. Chances are his experience will be limited and certainly he will

have limited facilities for the obtaining of much accessory detail always required in a job of this kind.

As to proper equipment to control and operate the motor, his firm may handle these items, but if that wholesaler must see to their installation, then he is definitely in the contracting business, and as such must begin to assume some of the natural overhead charges of contracting. The recent practice of some wholesalers of supplying materials, motors and miscellaneous equipment direct to the consumer or builder and assisting in the hiring of a supervising electrician and other electricians to install the work, is virtually a matter of going into contracting. It is this move that has caused many contractors in retaliation to eliminate the wholesaler in their dealings—thus virtually in some cases becoming quasi-wholesalers themselves.

The next point, that of guaranteeing that the installed job shall conform to codes and safety orders, and pass inspection, likewise depends upon an active entry into contracting with all of its hazards and responsibilities.

Such responsibilities jobbers have not been willing to face. And yet, by selling materials for installation direct either to an industrial plant or to ordinary laymen, they are encouraging, unwittingly, the avoidance of city and state accident inspection and contributing to the installation of equipment in a slipshod and often a hazardous manner. The great increase in uninspected wiring in industrial and commercial buildings can be laid directly to the direct sale of materials to handymen and owners of such places. Either the rules and safety provisions of codes are necessary to safeguard life and property or they should be abolished entirely. To contribute to a generally hazardous and sloppy wiring situation is no credit to the wholesale branch of the industry.

Emergency service, night or day, the wholesaler is not equipped to give. A shop and organization to handle this phase of the business is a costly item of procedure, though a necessary one to fulfill the consumer's requirements.

Spare parts the wholesaler already sells direct far too much. Again, he sells only the parts for the motors he stocks, and this limited service is not enough.

On the last three points—reconditioned second-hand equipment, rental equipment for emergencies, and the very necessary service of exchange or trade-in on usable equipment and material, where real economy dictates—the wholesaler is quite unprepared to function.

### What Wholesalers Face

Altogether, the wholesaler is faced with the problem of whether his is an essential function in the scheme of distribution or whether he must definitely become a dealer or contractor and stand the consequences. If his is an essential function it is becoming necessary that its responsibilities and field of activity be defined and adhered to. With the loose jumping around into other fields of activity so prevalent today, most wholesalers are neither fish nor fowl. As such they are prey on the one hand to the unrepresented manufacturer who sells direct, and whose own field staff and local stock are in themselves the nucleus for a jobbing company. On the other hand, they are prey to the large contractor who either manufactures some items himself as a side line or who purchases in quantity direct from the manufacturer, and sometimes acts as the latter's jobber in the territory.

Maybe it is pertinent that these questions be asked: What is a wholesaler, and why? What is a dealer, and why? What is a contractor, and why? Certainly consistency would be a great help. If a wholesaler prints "Wholesale Only" on the door of his establishment and then sells at retail he is in no better position than the contractor or dealer who goes direct to the manufacturer for his materials. In public statements and gatherings of the industry wholesalers often represent that they sell at wholesale only and ask for dealer support. If they do sell something direct, however, their plea is "We've got to sell it that way. It's self-preservation." By the same plea of self-preservation, dealers can justify direct buying. If distribution is to run on lines of self-preservation only, the wholesaler must consider very seriously which of the two such a struggle for survival of the fittest most likely will eliminate, wholesaling or contracting.

In the face of this distribution chaos the wholesalers seem to be doing very little, with one or two exceptions. What they should do in all divisions of their work is not the province of this article to suggest, except only as respects motor distribution and industrial business.

After years of effort, the Motor Section of the Electragists and the motor manufacturers have come to some common understanding as to classification of accounts. Although not fully satisfactory, the Class A, B, C, D, E, and so on, lines of customers are fairly well defined. All the Class A customers (small industrials and commercial nouses) and many of the Class B, or larger industrial concerns, motor manufacturers have quite generally conceded belong to the dealer.

### Classification and Policy

Yet, while motor manufacturers have classified their accounts, the jobbers of some of those same manufacturers do not recognize the same classifications. This is a sad commentary on the logic of executives of such companies. The manufacturer seems to have one idea of what is good economical practice and the manufacturer's own distributor another idea. If the policy means anything at all the manufacturers have a responsibility to see that their distributors adhere to that same policy. At the present time the situation is, in effect, one in which the wholesalers do not recognize the classifications of trade made by their own principals. The manufacturers who have made such classifications must have been convinced that they can serve such classes of trade more economically through the dealer. They may not be fully convinced yet because too few actual costs of selling have been examined. Neither the manufacturers, wholesalers or dealers have known what it costs to sell, nor have they made any effort to find out.

Recently the National Electrical Wholesalers Assn., in cooperation with the Domestic Commerce Division, Department of Commerce, did conduct a study of distribution costs over a three-year period, analyzing costs, territories, customers and commodities.

The author submitted to manufacturers and the industry possibly the first completely frank and detailed distribution cost analysis on motor distribution costs of a dealer which had ever been revealed. (*Electrical World*, April 25, 1931, "Facts and Ideas on Sales," by Frank E. Boyd, subsequently reprinted and circulated by the Association of Electragists, International.) Many of these facts will be repeated and added to in subsequent articles.

It is only with such actual studies of facts and figures that a proper appreciation of the economy or uneconomy of distribution can be gained. But it is mighty important that it be done immediately.

From their study the wholesalers would do well to get clearly in mind just what field they intend to serve and how they will serve it. One of the first things of benefit will be the definite classification of which accounts they feel it is legitimately their province to serve, as the motor manufacturers have already done. In this way they can best save themselves from the reprisals of contractors and dealers, can arrange proper distribution for all manufacturers, and bring their share of effort to stabilize an industry which is so drastically in need of it today.

At this point it would be well to call to wholesalers' attention that if manufacturers are not provided with proper wholesale outlets for their products, it is only to be expected that they will enter the field in direct sales. Either the wholesalers should see that these manufacturers do get wholesale distribution among them, or face the issue of direct competition from the manufacturer. In this matter the small independent wholesaler must be recognized as a logical and beneficial factor in distribution and should be assisted in performing that function. The wholesalers may as well face this fact and learn to like it, for it will always be a source of misunderstanding among them, if ignored.

The contractor, too, must face this situation squarely. It is practically impossible for him to do so alone. The wholesaler and the contractor or dealer each today threaten the extinction of the other. The truth finally will probably be found to be that neither can be eliminated. It will probably be evident that each should be allowed,—no, even stronger than that,—*must* do his own job in the scheme of distribution without skimping or sliding out from any of its responsibilities. Until both do their jobs and stay in their own yards, there will be much dog-eat-dog and the hunt for new bones will be neglected.

At least the public—the primary premise, remember, is that "Business exists for the consumer"—will find this means of obtaining motor service too costly and may seek elsewhere for the work and materials it would otherwise be glad to receive from the electrical industry.

So far too much time has been wasted arguing as to who started some practice and as to who is right and who wrong. Forget who started it. Let both contractors and wholesalers get their own affairs in shape now, clean house, and start fresh with a strong backing of self restraint. Whenever either contractors or wholesalers discuss ways and means of getting back onto a basis of clear cut distribution and respect for their own fields of activity they think in terms of controlling their competitors. Fancy cure-all methods and elaborate schemes are proposed.

The situation does not need fancy methods. It *does* need badly some individual self restraint. Personal control of each individual business along sound lines is the only control that will work.

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EDITOR'S NOTE—This is the third of a series of studies on "The Economies of Motor Distribution," of which the first was, "What Factors Make for Distribution Economy?" Jan. 1, 1932, and the second, "Every Manufacturer His Own Distributor," April 1, 1932. Another of the series, to appear shortly, will deal with the extra-industry suppliers of motors—the broker, the chain store and the junkman.

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## Making One Motor Do the Work of Two

DROPPING of the water level in underground supply is a cause of great concern to farmers. Sometimes it offers a threat of replacing an electrical drive for pumping installations with other forms of power. A means of making one motor do the work of two in areas where such water conditions exist has been devised and used successfully near Riverside, Calif. Instead of the usual direct-connected vertical type motor attached to a pump, an ordinary horizontal type of motor is used. The main bearing is sometimes changed and heavy grease is used for the lubrication of the shaft. A base is adapted so that the motor may be set on end, usually by means of a plate as shown in the illustration. The motor operates at the same over-all efficiency as a direct-connected motor drive but offers greater flexibility in this respect. By the

interchange of pulley sheaves several ranges of heads can be obtained. Most common instances are a 10 per cent increase in speed by the use of a different pulley combination, which overloads the motor 33 per cent but results in a 20 per cent increase in head for the pump.

The sheaves are grooved and the connection is made by means of the V type of rubber belting. Ranges of motors from 5 to 100 hp. are equipped in this manner.

As arranged by Layne & Bowler, the drive is 144 in. long or from 48 in. to 53 in. on centers. Six belts are used on a 75-hp. job, although four belts will trasmit 75 hp. satisfactorily. The motors operate at 1,750 r.p.m. which makes a belt speed of 4,700 to 5,000 ft. a minute. Two sets of pulleys give two pump speeds, whereas with three pulleys six combinations of pump speeds are provided. Thus for a pulley cost of $35 to $70 the farmer has the equivalent of two different pumping installations.

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## Testing Transformers On Wheels

A TESTING transformer on wheels which can be moved about to any part of the large shop, has proved to be a very useful device at the shop of Norton & Norton, Los Angeles motor specialists. The transformer was built in the contractors' own shop. It is equipped with a long length of portable cord to connect to power supply and has mounted on it the necessary breakers, control apparatus and test leads.

Another very useful tool used in this shop is the Prest-O-Lite tank which is used for all soldering operations.

# Distribution Substation Designs

CURRENT policies demand a thorough investigation of the mounting costs of distribution. While service and reliability are of paramount importance, many companies have found it possible to simplify the installation, lower the investment and effect operating economies in the design of their smaller distribution substations. Three such designs, all having certain advantages, are included in the following descriptions.

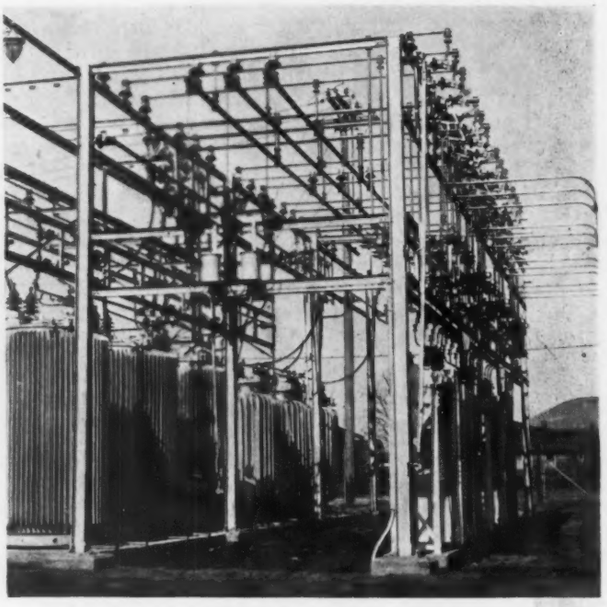


*Fig. 1—The 2,300-volt bus of the Cherry Ave. substation showing automatic reclosing breaker installation*

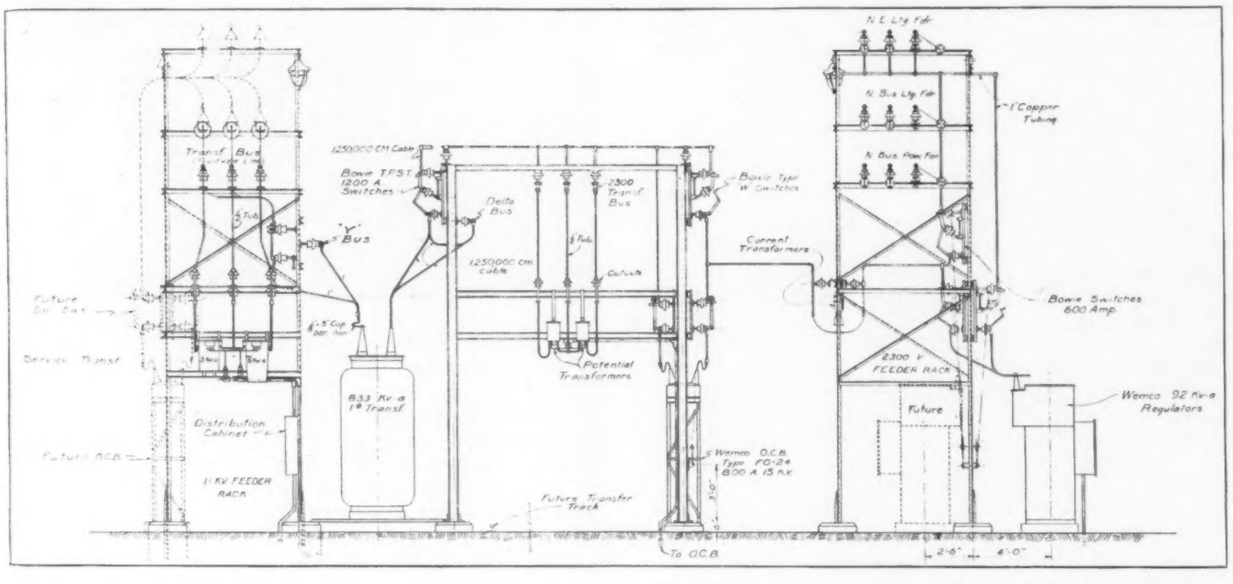
## Small Substation for High Class Suburban Area

*By* D. R. McCLUNG
Engineer, Pacific Power & Light Co., Portland

NO MODEL was found to guide the design of the new 5,000-kva. Cherry Ave. substation of the Pacific Power & Light Co. in Yakima, Wash. For economy it was desired to place all equipment outdoors, including secondary feeder regulators and switches, and it was necessary to provide for 11-kv. primary feeders entering and 2.3-kv. secondary feeders leaving the station at either end. Primary feeders did not require breakers at this time, but it was desired to supply automatic reclosing breakers on the secondaries. The station was to serve a business and industrial district and required voltage regulation on the lighting feeders but not on the power feeders. No precedent exactly fitting these requirements could be found. Economy of investment and operation was the dominant factor in the design evolved, which is shown in the drawings.

The switching and bus structure is entirely of steel. At the present the station contains one 11-kv. feeder direct from Fruitvale substation and one 11-kv. tie-line. Space is provided for additional primary feeders, and for breakers on all primaries as soon as the growth of the system demands. There are two banks of three 833-kva., 11,000/2,300-volt, G.E. transformers and one spare. Two 2,300-volt lighting feeders are regulated with banks of single-phase, 400-amp. regulators. The four secondary feeders at present installed are equipped with Westinghouse FO-24, 15-kv., 800-amp. automatic reclosing circuit breakers, each with instrument house. All current and potential transformers are of the outdoor type mounted on the switching structure. Space is provided for two additional 2,300-volt feeders and circuit breakers.

*Fig. 2—Elevation of Cherry Ave. substation. The complete layout is designed to furnish high-class service at a moderate first cost*



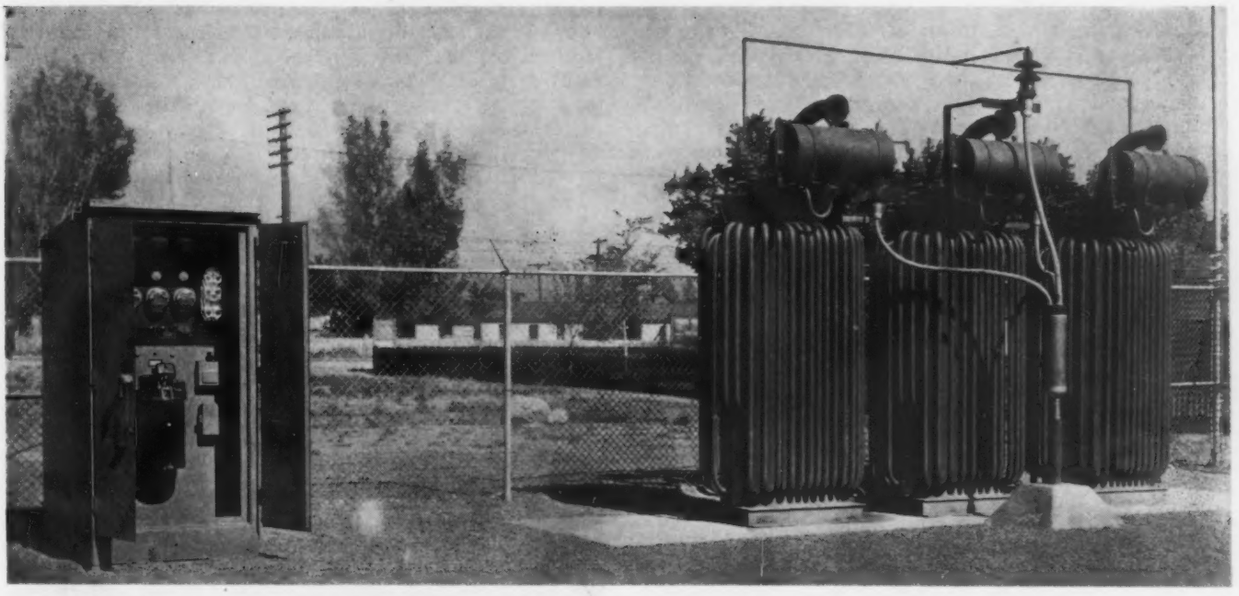


*Fig. 3—Neat, compact design for small-capacity substations serving residential areas. Note absence of steel framework and comparative ease with which equipment is installed*

## Modern Design For a Small Substation

*By* L. O. B. LINDSTROM
General Electric Co., San Francisco

WHILE reliability of service and assurance against interruption delays are paramount factors in substation design, other important features have been designed into a recent installation of the Sierra Pacific Power Co. at Reno, Nev.

Substation equipment consists of three 667-kva. transformers, 22,000 volts to 2,300/4,000 volts, Y-equipped with conservator oil tanks. Low-tension switching equipment is housed in the standard switchhouse and consists of one high-rupturing-capacity oil circuit breaker operated by a motor mechanism and equipped with a reclosing mechanism which is timed to give three possible reclosures without locking out. Overload protection is supplied by three overload relays with reactor trip. The total power is measured with a three-element polyphase demand watt-hour meter.

This substation varies from the conventional design in that all services are underground. Primary power is supplied by underground lead cable from a fused air-break switch mounted on a pole outside the substation enclosure. Secondary services are also lead-covered cable running between the transformer bank and the switchhouse and the aerial lines which are fed from this installation.

The standard switchhouse, which has bushings for top or side entrances, was modified for the use of cable entrance from beneath the house.

Reliability of service, complete protection to apparatus, and reduced investment and installation costs are made possible by this design, which presents an unusually attractive appearance. These desirable economic features incorporated in this type of automatic substation permit favorable comparison between comparatively small units of 1,500 to 2,000 kw. and a heavier concentration of power at a single substation serving a larger area.

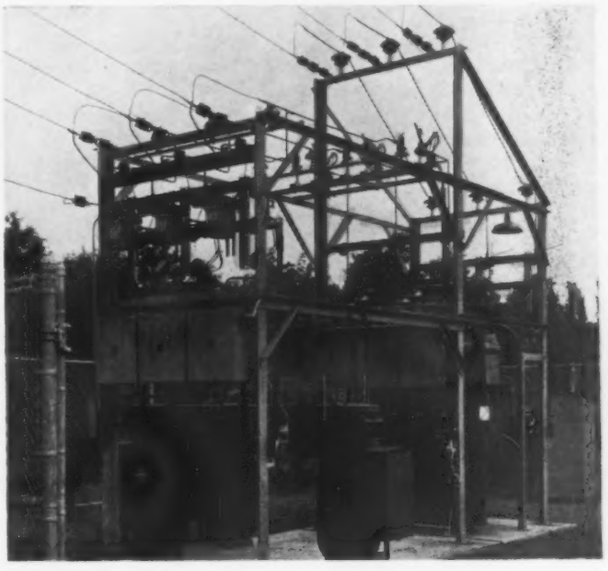
## High Salvage Value In Standardized Substations

*By* JOHN BANKUS
Electrical Engineer, Portland General Electric Co.

DURING the last ten years the Portland General Electric Co. has experienced a very substantial load increase in all districts served by its primary feeders. The growth of the city and surrounding territory, together with the increasing use of electricity for lighting, electric ranges, water heating, refrigeration and numerous appliances in the office and home have necessitated many additions to its substations and distribution system. A large part of this load has been taken care of by adding outdoor substations. These are of two principal types.

The first type is a single-feeder station which may be

*Fig. 4—High salvage value, flexibility and low first-cost are design features of this distribution substation. Additional sections may be added as units if load increases, or original structure may be modified readily for increased capacity*



used for either 2,400 or 4,150 volts. Fig. 4 shows a 600-kva., 11,000/2,400-volt station of this type. Changes are made easily when the capacity of the above station is increased to 1,500 kva. or the feeder is made 4,150-volt.

The second type is a multi-feeder station which has a duplicate 11,000-volt supply. This type permits adding feeders with required transformer capacity to keep pace with the load.

Experience over a ten-year period has shown that the above types have been well adapted for taking care of the load growth. The 600-kva. stations have proved especially desirable for taking care of new districts where the load is growing but does not yet justify the expense of a major substation. These stations have a very high salvage value and can easily be moved to new locations when load conditions require more capacity.

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# Sea-Going Line Crew Needed To Build Transmission Line

*By* J. I. BOULIAN
Construction Superintendent, Power Corporation of Canada, Ltd.

PUTTING out to sea to build a transmission line is not the paradox it would at first appear, particularly to anyone familiar with geographical conditions of northern British Columbia. There, the terrain is extremely rugged, limiting possible transmission routes to the shores of the larger rivers of the section. Construction along such routes is further hampered by the natural characteristics of the river banks, which are steep bluffs indented by tidal flats.

In constructing a 66-kv. transmission line for the Northern British Columbia Power Co. between Falls River and Prince Rupert, the Power Corporation of Canada was confronted with the problem of traversing 44 mi. of the country described above. Future requirements demanded that two circuits be provided for, but as the right-of-way was far too narrow to permit this, the wood-pole supporting structures were designed to support the future circuit in addition to the present line. Following the shores of the Ecstall and Skeena Rivers, the right-of-way consisted of tidal flats covered with dense vegetation and large trees interspersed with long stretches of steep bluffs.

So precipitous and broken are these shores that it was not practical to establish shore camps. The construction crew was housed on a large raft and towed along the river. Tidal variations averaged 18 ft. and reached 24 ft., and in places tide velocities exceeded 6 mi. per hour. The raft had to be sheltered from strong tides and winds and tied in such a manner that it would not be piled up on the shore by a high tide. Such a raft, 110x60 ft., could only be moved at periods of slack tide, and since the periods of slack are short, quick and skillful handling was required. The work on this section was all done by water, the bluffs being so steep that in many cases it was impossible to walk or crawl from structure to structure. Men were taken to work in flat, shovel-nose boats propelled by outboard motors; these craft had to stand by to move the men from one place to another.

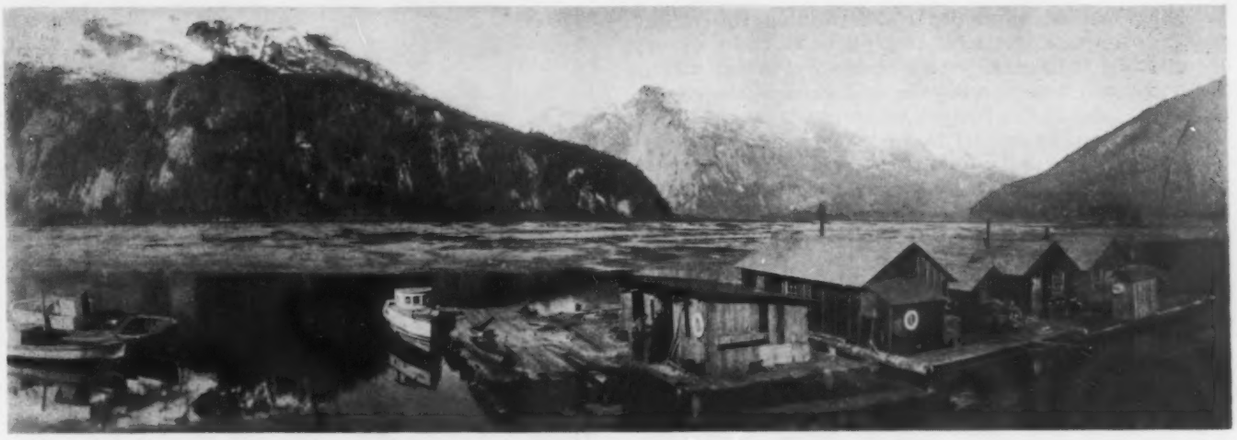
An air compressor carried on a raft was tried without much success. It was difficult to find safe mooring and, when it could not be held near the holes to be drilled, the trouble of laying an air line more than offset the speed of mechanical drilling. Poles were towed to their location and a raft carrying a double-drum gasoline winch was tied near the station and the poles hoisted up the cliffs and set in position; footing was too difficult for poles to be piked up. On this stretch of line span lengths varied from 75 to 1,700 ft. In many places great ingenuity was required to get around bluffs or under overhanging cliffs. To string the conductor, reels were placed on a raft, the winch cable strung from structure to structure and the conductor hauled in.

The crossing of the Skeena River is 7,865 ft. long, one

*A construction crew going to work*

*A transmission line "location" with the right-of-way so steep that men working on the structures were lashed to hand lines and moved along the route in boats*

*Anchor tower on a bluff overhanging the Canadian National Railway tracks*



*A glimpse of the rugged country traversed by the line and the floating transmission construction camp with boats necessary to take the crews between structures along the river banks*

of the longest of its kind; this distance is covered by four spans of 1,850 ft., 2,100 ft., 2,100 ft. and 1,815 ft. with three main towers in the bed of the river on gravel bars exposed at extreme low tides. As the foundations are exposed to heavy ice pressure due to the strong tidal currents, they were protected by a heavy rip-rap. The steel towers are 156 ft. above their foundations, carrying two 3/0 copper-weld circuits with a clearance on the main channel of 60 ft. above high tide.

For 3 mi. from the river crossing the line is built on the bluffs overhanging the main line of the Canadian National Railway, providing additional difficulties. As trees were felled they were lashed so that they would not fall on the tracks and block traffic. Blasting was attended by the danger of material being blown on the tracks or the chance that the vibration would dislodge materials and start a rock slide. Poles were distributed along the track and hoisted up the cliffs with a gasoline hoist.

Where the line ran inland for 14 mi. the deep muskeg on that section made it necessary to build corduroy roads. As the timber in that section run 4 and 5 ft. in diameter at the butt, the cutting and splitting of corduroy is extremely costly. In the latter section the line crosses a ridge 700 ft. high, the last part of which is almost a sheer wall rising for 200 ft., making a cableway necessary to carry material over this section of line.

A few miles farther along the line ran along the shore of Rainbow Lake where it was necessary to resort to the construction methods used on the Ecstall River, namely rafts carrying winches which would hoist the poles in place.

Probably no other 44-mi. stretch of line has presented so many varied and difficult construction problems, problems which required the utmost ingenuity in the use of men and equipment to bring the project to a successful termination.

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# That Ounce of Prevention for Employees Exposed to Poison Oak

*By* F. A. CUTTER
The Cutter Laboratory, Berkeley, Calif.

WITH the advent of summer and the accompanying pilgrimages of maintenance and construction crews to the open spaces, the season for poison oak cases will soon be at its height. Preparing employees for exposure to this shrub may minimize the loss of man-hours and much personal suffering.

In many rural communities in which the poison oak plant, and its cousin, the poison ivy, flourish, there is a rather widespread belief, taking its origin perhaps in Indian tradition, that eating the leaves of these plants will render one unsusceptible to the unpleasant skin eruption which often follows natural contact with them. Undoubtedly the practice has done a great deal of harm, because there were no means of determining how much leaf tissue constituted a protective instead of a poisonous dose. That occasional good did result when, by accident, one hit upon the proper dose is in accordance with the scientific principle that the body is capable of building up a resistance—of becoming relatively unsusceptible—to certain noxious substances when these are administered in very minute and graduated doses over a period.

Modern chemistry has found a way by which the rash-producing element of the poison oak (and poison ivy) plant can be isolated in a pure form. It thus becomes possible to administer very accurately gaged doses of the active principle. By beginning with minute amounts and gradually increasing the size of the dose, such a resistance to the toxin is established that dermatitis no longer follows an ordinary exposure.

Dosage is administered both by the injection and by the oral route. The injection preparation, known as *toxok*, is given in three weekly doses. The other, known as *poisonok*, is given by mouth in small increasing amounts three or four times daily. Treatment is started usually about a month before the expected exposure; and in a few highly susceptible individuals it is found necessary to continue with an occasional dose throughout the season.

The amount necessary for complete immunization varies with the individual. Some may require only half the contents of a single bottle, while others require not only the full contents of a single bottle, but an additional one, two, or three bottles throughout the season. The

following method is used for determining the proper dosage: A single treatment is given of three injections, or one bottle if the oral method is used. Further dosage is carried out usually with the oral extract (*poisonok*) if and as long as the patient develops a rash following exposure to poison oak. The following season this total dosage is repeated. In immunizing individuals who are known to be particularly susceptible to poison oak it is better to start with more than a single bottle of the oral extract, or more than the three injections of the intramuscular extract. This procedure minimizes the possibilities of insufficient dosage.

Even then there will be a certain percentage who are not completely protected, although it will be observed in most cases that those few individuals developing a rash on contacting poison oak following the immunizing treatment are only mildly infected.

Preparations such as these are not, nor are they claimed to be, 100 per cent effective. They are not patent medicines. For the most part they are produced in biological laboratories specializing in the production of vaccines and other immunological products. Those preparations bearing a federal license number on the package are produced under government supervision. They are true to label and will produce results comparable to the results which are to be expected from many good biological products.

In treatment of poison oak after it has developed, the injection treatment has no rival. While the oral method can be, and is, used with admirable results in many cases, the striking and almost never failing results obtained with the injection method makes it the product of choice, when a physician is available to administer it. There is no physician familiar with its use who does not consider it his greatest weapon in the treatment of poison oak dermatitis. He may use local salves and lotions to allay the itching; but he knows that internal or injection treatment with the extract is the only one so far discovered which will effectively modify the course of the rash.

Nevertheless, unnecessary exposure to poison oak is dangerous. The greatest immunity will not stand up against foolhardy and overwhelming exposure, and the best of treatment will not prevent a good many hours, perhaps days, of suffering after exposure. Scrub with several latherings of strong laundry soap as soon as possible after contact with the plant. Remember that in spite of the fact that he has been vaccinated, the physician changes his clothes and scrubs himself thoroughly after a visit to a patient with a contagious disease.

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# Electric Fish Screen Gives Effective Protection

THE destruction of food fish in canals, penstocks and flumes has long been recognized as a problem of most water development projects. Federal and state legislation has made protective devices mandatory for diversion channels on fishing streams and lakes, but such devices as were available until recently for this purpose have proved unequal to the task.

Most of these devices were mechanical in their nature, either a mesh screen across the channel or a revolving device intended to operate from the velocity of the stream flow. The former, of a mesh sufficiently small to protect the small fish, clogged rapidly and the latter were subject to jamming from floating debris. Although it was known to be possible to exclude all water-dwelling species from an electrified zone of water, the problem of electric protection was to accomplish this without a high mortality rate among those species possessed of abnormal perseverance or curiosity.

*Installation of the new electric fish screen showing the chains which provide one electrode for the electrified zone across a diversion channel*

Under the theory of electric protection, the body of a fish has a lower resistance than the water and when it enters the electrified zone forms a parallel path with the water for the current flow between the electrodes. Being of relatively lower resistance, the severity of the shock will depend upon the size of the fish, which is precisely the result desired. By this method an invisible screen for any size of fish is readily obtained, but continuous uninterrupted electrification defeats its own purpose by producing either temporary paralysis during which the fish is carried into the diversion channel, or instant death which removes the fish from a useful existence.

A recent development in the electric fish screen has modified the electric circuit with an interrupting device which can be adjusted to supply impulses of proper frequency and duration to the electrified zone to divert the fish from the inlet without harm. Mechanically, the scheme, illustrated in the accompanying photograph, consists of an electrode made up of a number of galvanized chains suspended at even intervals across the diversion channel from an insulated cable at right angles to the stream bed. They are of such length as to clear the stream bed approximately 6 in. and can be weighted to compensate for stream velocity. The other electrode is a chain or cable lying parallel to the first on the stream bed, its position upstream or downstream depending on the direction in which it is desired to divert the fish. Spacing, frequency of impulses, applied voltage and position depend upon the velocity of the stream, the physical characteristics of the fish native to the stream and their swimming speed.

In a recent investigation of this device made before the U. S. Bureau of Fisheries and the Oregon Game Commission at the Delph Creek hatchery, the results were highly satisfactory, only five small fish being found in a diversion ditch protected from the main body of water in which 1,200 fish in sizes from 3 to 14 in. had been liberated. Large schools of fish were observed repeatedly to approach the screen and, upon contact with the electrified zone, reverse their direction and swim strongly upstream.

The development of this device was made by Henry T. Burkey, of La Crescenta, Calif., who spent several months cooperating with the U. S. Department of Fisheries. Contracts for the manufacture and installation of the device will be handled by the Quality Electric Co. of Los Angeles.

# Load Ratio Control for Small Transformers

**Load and Voltage Regulation Provided With Low Investment by New Mechanism Especially Applicable to Smaller Transformer Banks of Outlying Substations**

*By* W. C. SMITH
Engineer, General Electric Co., San Francisco

WITH the growth of load centers and interconnections, transformer tap changing under load conditions has become an increasingly important method of regulating voltage. Formerly, manually operated ratio adjusters were the only means of performing this function, but advances in transformer design have included the automatic load ratio control which operates through various combinations of contactors, reactances and regulating mechanisms to maintain line voltage on the transformer tap setting nearest to a predetermined voltage value.

Because of the elements of cost and space requirements, this type of voltage regulation has been limited to transformers of large capacity. In the few cases where small banks have been equipped with it, practically the same general form as developed for the larger capacities has been applied, smaller capacities heretofore not being available because of inherent design problems.

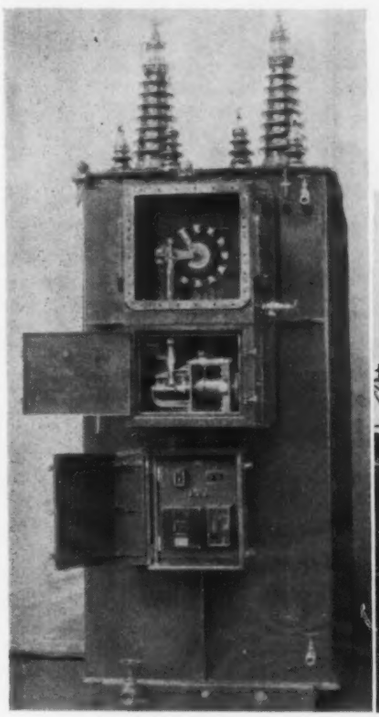
Recently the Pacific Gas and Electric Co. installed at the Healdsburg substation a bank of 500-kva. transformers, rated 57,000-Y to 7,200/12,470-Y volts, embodying a new and interesting form of voltage control which has been designed by the General Electric Co. to meet the requirements of automatic load ratio control in stations of relatively small capacity.

These transformers are of the self-cooled type, having the heat-dissipating tubes banked on one side of the rectangular tank in order to provide room for the load ratio control equipment. The accompanying close-up view of one of these transformers shows the oil-immersed ratio adjusters at the top, connected directly by vertical shaft, through a mercury stuffing box, to the driving mechanism in the compartment beneath. Mounted below the motor drive will be seen a standard regulating panel protected by a weatherproof sheet-steel housing.

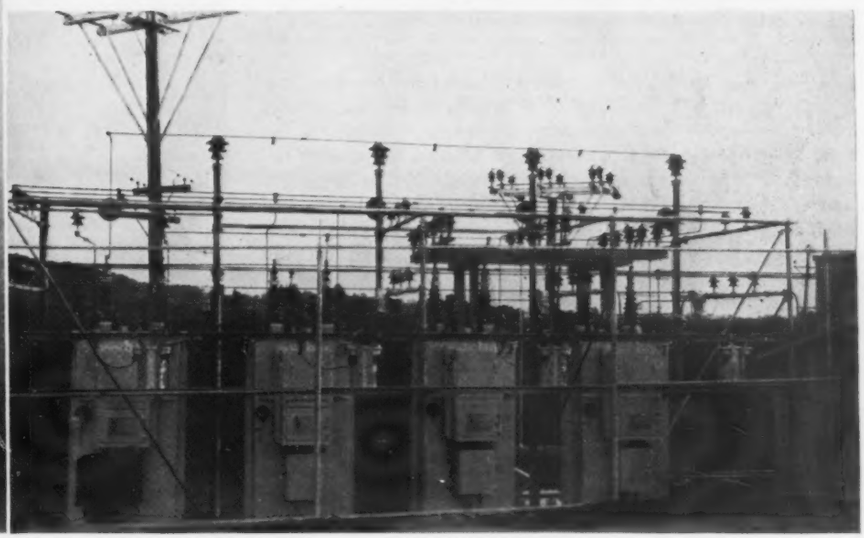
The voltage range of 10 per cent above and below normal is secured through the use of an extension of the 7,200-volt winding with four 2½ per cent taps, and a like number and range of taps on the 7,200-volt coil itself. A 50 per cent tertiary winding for 2,520 volts, with a 2,400-volt tap, was furnished with these transformers for third harmonic suppression.

Tap changing under load is accomplished by a new principle which eliminates the usual contactors and imposes arc-interrupting duty on oil-immersed adjuster contacts. Research, backed by life tests, indicated that for currents under 100 amp. and interrupting voltages not exceeding 600 to 700 volts, over 100,000 operations could be expected from a single set of contacts.

Further investigation disclosed that the usual two-ratio adjusters could be combined into a single twin mechanism at the same time incorporating in it an intermittent movement secured by two insulating Geneva gears. The base plate of the mechanism bolts, with an oil tight joint, over an opening in the tank wall, thereby making it possible to connect the transformer taps directly to the inside end of the adjuster studs. The two movable contact arms are connected to the ends of a



*Below—Healdsburg substation showing the four 500-kva. transformers to be equipped with the new type of automatic load ratio control for small power transformers. Left—Closeup of the automatic tap-changing mechanism. Two contact arms, mounted on the center stud, normally rest on the same contact but bridge between two contacts during change-over to subsequent tap. Contacts operate under oil, being actuated by the regulating panel shown below*



current-limiting reactor mounted on top of the transformer core, the mid-point of the reactor becoming the secondary line lead.

Normally the two contact arms stand on the same tap stud, the load current dividing equally through both circuits of the twin adjuster and both halves of the reactor. A change-over from one tap to the next is effected by first moving one contact arm, at which position the circulating current caused by the voltage of one tap step is limited by the reactor. An instant later the other arm is moved to the new contact and normal operation is again effected without having at any time interrupted the main circuit. This whole change-over operation is carried out in the remarkably short time of one-twentieth of a second by means of a special driving mechanism, shown in the middle compartment.

The motors used are single phase, rated 1/100 hp. and wound for 110 volts, 60 cycles, with a speed of 1,725 r.p.m. They are energized directly from the contact-making voltmeter, and store up energy in heavy coil springs, which upon releasing suddenly, operate the twin adjusters at the high speed mentioned above. Approximately 20 seconds are consumed in fully winding up the spring, thereby providing sufficient time delay to avoid continual movement of the mechanism under transient variations in voltage.

As accessory apparatus, there are provided a cyclometer counter indicating the number of switch operations; a position indicator showing which tap is in service, this being particularly important under emergency hand operation; a suitable limit switch to insure that the driving motor will not proceed past the end positions; and a safety circuit to prevent the operation of the motor in case of breakage of the heavy coil springs.

More than an ordinary amount of interest has been created by this new development of load-ratio control apparatus because of the possibilities offered by it in the field of voltage regulation of small transformer banks. The new mechanism also will be used in the General Electric Co.'s primary network unit where reliability and dependability are of utmost importance.

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# Speeds Up Testing Of Rubber Gloves

*By* FRANCIS CURTIS
The Southern Sierras Power Company

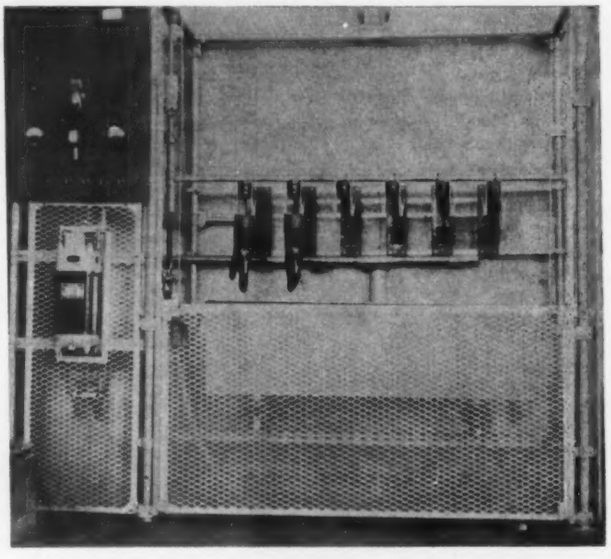
EVERY rubber glove used by the linemen of The Southern Sierras Power Company, Riverside, Calif., must now be subjected to a high-voltage test on apparatus designed by the engineering department of the company and built in the shops. As a pair of gloves is issued to each lineman every two weeks, the new glove testing machine has added a large safety factor to high tension work.

The apparatus is enclosed within a 1¼-in. pipe frame to which are fastened screens made of Steelcrete. At one end of the pipe frame is mounted the control panel containing switches, carbon circuit breaker, relays and indicating instruments, which arrangement facilitates the testing by having all controls at one convenient location. In the rear of the control panel is installed a 110/11,000-volt transformer which is energized in connection with a 2-kva. hand control voltage induction regulator mounted just below the control panel. Mounted next to the step-up test transformer is a potential transformer provided for the voltmeter in order that actual test voltage readings may be had rather than depending upon a constant equal to that of the test transformer ratio and the error incident to the latter.

Within the enclosure is mounted a tank sufficiently large to permit the testing of three pairs of rubber gloves at one time and insulated from ground by 17-kv. insulators. Immediately above the tank is a movable frame to which the six gloves are fastened. A safety feature giving access to the glove rack and test tank has been provided in conjunction with the movable safety screen consisting of a mechanically operated switch that is closed only when the screen is raised to the upper position. The switch is connected in the control circuit; it prevents operation when open, and guards the operator against accidental contact with live parts in the event the screen barrier is not in the raised position.

The gloves are hung in position on the test frame by suitable clips, filled to the proper height with water, and lowered into the testing tank. Connection is made to the inside of each glove by small flexible chains which in turn are fastened to solenoid operated switches mounted above the test tank. These solenoid operated switches are controlled from the control panel by means of push button switches, the connections being such as to connect a milliammeter into the circuit of any one of the gloves under test and allow a current reading to be taken. If a reading of greater than 10 milliamp. is obtained in leakage current, the glove is considered unsatisfactory.

Another feature incorporated in this glove tester is that of a long time delay relay which governs the length of time that a test is conducted on one set of gloves. The



*The new rubber glove tester with two gloves in place. On the left is the central control board. The water tank and insulators can be seen through the screen*

relay is a type MC-11 long time delay relay which insures a full period test of 3 min. on each glove at a voltage of 10,000 volts. The normal procedure in conducting a test is for the operator to lower the gloves into the tank, raise the safety screen barrier, close the circuit breaker and raise the voltage on the gloves by means of the hand operated induction voltage regulator. The operator may then take readings of leakage current on the individual gloves, and his attention to the length of

time of the test is not required since the MC-11 relay automatically opens the control circuit after a period of three minutes.

Through the medium of this glove tester one man can test 100 pairs of gloves in half a day.

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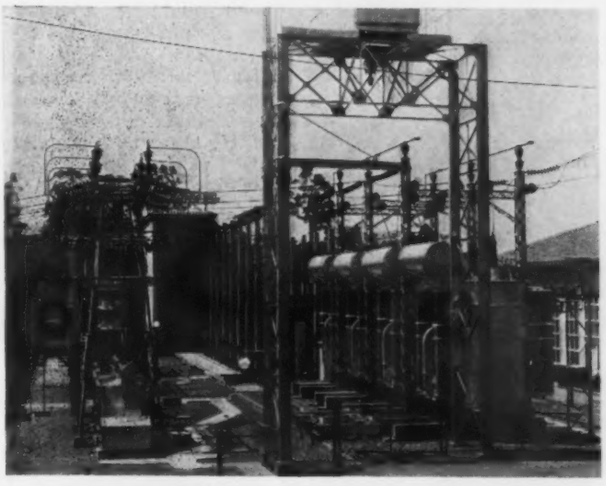
## Auto-Transformer Bank Provides Tie Between Systems



AT Claremont substation, near Oakland, Calif., a bank of three auto-transformers provides an inter-connection of 90,000 kva. capacity between the Pacific Gas and Electric Co.'s system and that of the Great Western Power Co. Ordered for straight transformation at 20,000 kva. capacity, before the consolidation of the two companies, these units were converted at the General Electric Co.'s factory for use as auto-transformers with 30,000 kva. capacity each at a rating of 110/95 kv. Although the bank is self-cooled, supplementary blowers on the radiators automatically are turned on when the load reaches 60,000 kva. When both of the inter-connecting circuits are in service, the bank is protected by a balanced relay system, with provisions for single-circuit protection when one line is disconnected. Previous to this tie, power had to be circulated through 90 mi. of line.

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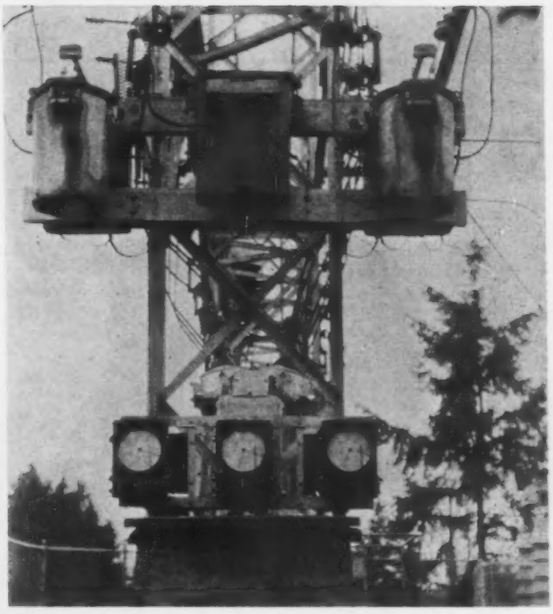
## Recording Voltmeters

PUGET Sound Power & Light Co. is using a unique system to determine ground conditions on its 13.8-kv. Delta circuits. The recording ground detector consists of three recording voltmeters with three potential transformers connected in star. This connection with 13.8 kv. on the system gives 6.9 kv. across each potential transformer. These transformers are standard 120:1 ratio and the meters are seven-day circular chart with law of squares movement giving uniform scale of zero to 135 volts.

With the line clear of grounds the meters record at half-scale or 6.9 kv., stepped down to 57.5 volts. If a ground occurred on one phase near the potential transformer ground, the wire in fault would be at zero potential with the ground, as the potential transformer on the line would be in shunt with the ground and so recording no voltage. The remaining two wires would feed their respective potential transformers with full



*Puget Sound Power & Light's recording ground detector*

potential as the ground now is the third wire of the system. The meters on the wires clear of trouble will record full potential and the grounded phase zero. With a ground on the system some distance away the voltages recorded will be in proportion to the drop through the ground. If two wires are grounded the voltage will decrease on two meters and increase on the third. With all wires grounded, a decrease in voltage on all three meters will be recorded.

This system gives a permanent record of all ground conditions and the time when they occur.

## New Books

HANDBOOK OF CHEMISTRY AND PHYSICS, by Charles D. Hodgman, associate professor of physics at Case School of Applied Science, and Robert A. Lange, assistant professor of organic chemistry at Case School of Applied Science. Fabricoid bound; 4½x6¾ in.; 1,545 pages; illustrated. Sixteenth edition, published 1931 by the Chemical Rubber Publishing Co., Cleveland, Ohio. Price $5.—The latest edition of this handbook presents, in addition to former material, new tables on recent developments in the physical and chemical fields, included among which are tables on the characteristics of vacuum tubes, physical properties of woods, etc. Wherever necessary, material of previous editions has been completely revised and brought up to date in light of recent investigations. Suggestions and contributions received from users of the previous editions have been incorporated in this edition to make the handbook of greater utility and convenience.

ELEMENTARY HYPERBOLICS, by M. E. J. Gheury De Bray. The work is published in two volumes, each 5x7¾ in.; cloth bound. First edition, published by Crosby Lockwood & Son, Stationers' Hall Court, Ludgate Hill, London, E. C. Price 7s. 6d.—Volume one treats the hyperbolic functions of real and unreal angles. Volume two presents the applications of hyperbolic functions. The treatment of the entire work is especially adapted to the requirements of beginners in the subject, the student being led by an extension of algebraic reasoning to the principles of hyperbolic functions and from there to their applications in problems relating to electrical currents. Ample illustrations and a thorough treatment of the fundamentals endeavor to give the student a thorough grounding in the subject.

ARTIFICIAL LIGHT AND ITS APPLICATION IN THE HOME. Prepared by the committee on residence lighting of the Illuminating Engineering Society. Cloth bound; 6x9 in.; 145 pages; illustrated. First edition, published by McGraw-Hill Book Co., Inc., New York. Price $1.50. For sale by McGraw-Hill Retail Room, 883 Mission St., San Francisco.—The book presents a practical and concise treatment of artificial lighting and its application in the home. A simple, reliable but non-technical style should make the book valuable to homekeepers and may also serve as a text for institutions and other places requiring instruction on this subject. Fundamentals of lighting, color combinations, lighting equipment and adequate home wiring are included in the text.

# Death Takes John B. Miller, Chairman of Edison Company Board

JOHN BARNES MILLER, chairman of the board of directors of the Southern California Edison Co. Ltd., died in Los Angeles on April 14 at the age of 62 years. He had been the executive head of the Edison company and its predecessors for the past 31 years.

Mr. Miller was one of the country's outstanding utility executives and a national leader among pioneers in financing large electrical engineering developments in the West. Through his organizing genius and convincing faith in the future of southern California he effected the amalgamation of some 40 small electric light and power companies serving southern California cities, and after first overcoming the difficulties of interesting Eastern capital in a Pacific Coast enterprise, directed the expenditure of hundreds of millions of dollars for the construction of great hydro-electric plants, steam generating works and the building of extensive transmission and distribution systems.

Under Mr. Miller's direction the Edison company completed the ten-year Big Creek-San Joaquin River hydro-electric construction project in the Sierra Nevada Mountains, which involved the building of the famous Florence Lake tunnel; the construction of the world's first 220,000-volt transmission line to bring hydro-electric power from the Sierra to the Los Angeles area, and the development at Long Beach of the Edison steam-electric generating station, one of the largest in the country. The services of these electric facilities, as one unit, were extended by Mr. Miller and his organization to 360 cities and towns in California, following the consolidation in 1917 of the Pacific Light and Power Co. with the Southern California Edison Co.

In 1923, at the convention of the National Electric Light Assn. in Carnegie Hall, New York, Mr. Miller received the highest honor within the gift of the electrical industry. This was the gold medal of the Charles A. Coffin Foundation awarded the Southern California Edison Co. in recognition of its distinguished contribution to the development of light and power for the convenience of the public and the benefit of the industry during the year 1922. In his acceptance of the medal Mr. Miller said that throughout the company's history there had been close adherence to the company slogan, "Good service, square dealing and courteous treatment," and that the company's accomplishments had been made possible by a fine spirit of teamwork. The company's slogan was formulated by Mr. Miller himself.

The John B. Miller Medal for Distinguished Service was founded by Mr. Miller in 1928 and was first awarded, in that year, to Russell H. Ballard, president of the Edison company, for his contributions to the progress of the organization. The medal was again awarded in 1930 to George H. Stockbridge, transmission engineer now retired, for his many accomplishments during his long career with the company. The customer-ownership plan of the Edison company, which was inaugurated in 1917, was conceived by Mr. Miller.

JOHN BARNES MILLER
1869-1932

On Feb. 1, 1898, Mr. Miller became associated with the Edison Electric Co., predecessor of the Southern California Edison Co., in the capacity of treasurer. Two years before Mr. Miller, then 27 years of age, came to California for the first time and was so favorably impressed with the opportunities offered young men that he went East, closed out his interests there, and returned to California to make his home. In his first connection with the then struggling electrical industry of the state, he was associated with William R. Staats and Walter S. Wright of Pasadena and George H. Barker. Shortly after, he joined Henry Fisher, H. H. Sinclair and John S. Cravens of Redlands.

Mr. Miller's extraordinary executive ability, and his keen interest in philanthropic, cultural and educational affairs, was extended generously to many other prominent organizations. He always took an enthusiastic interest in sports, particularly polo and yachting. He was regarded as the father of polo in southern California and as the master of his 110-ft. yacht, *Sobre Las Olas*, was known to yachtsmen from British Columbia to the California Gulf.

Organizations in which Mr. Miller was interested actively are numerous and varied. He was a member of the Board of Incorporators of the American Red Cross, trustee of the Endowment Fund, member of the advisory committee, Pacific Division, and vice-president of the Los Angeles Chapter, a director of the Good Samaritan Hospital, a trustee of Harvard Military School and a member of the Society of the Sons of the Revolution and Society of Colonial Wars. He also was a member of the Knights Templar and was a Shriner. His clubs included the California Club, Los Angeles Country Club, Midwick Country Club, California Yacht Club, the Pacific Union and Bohemian Clubs in San Francisco, the Chicago Club and the Links Club, New York City.

Besides being chairman of the Southern California Edison Co. Ltd., Mr. Miller was chairman of the board and a director of Claude Neon Electrical Products Corp., president and director of the Landowners Co.; president of the San Joaquin and Eastern Railway; director and member of the executive committee, Security-First National Bank of Los Angeles and Pacific Mutual Life Insurance Co.; and a director of Claude Neon Lights, Inc., New York; Claude Neon Federal Co., Chicago; Shaver Lake Lumber Co., Highway Communities Corp., Ltd., and John B. Miller, Jr., Co., Ltd.

Mr. Miller's interest in the affairs of patriotic associations was influenced by his own early American ancestry. He was a descendant of Andrew Miller, who came from Germany to Shrewsbury Township, York County, Pa., in 1745 as a Mennonite refugee. His grandfather and father pioneered from Pennsylvania to the shores of Lake Huron, in what now is the state of Michigan, and Mr. Miller was born Oct. 23, 1869, at Port Huron.

From the local school at Port Huron, Mr. Miller went to Ann Arbor High School and on graduating in 1888 proceeded to the University of Michigan where he studied until 1890, when he returned to Port Huron to enter a law office. He later, in 1923, was awarded an honorary master's degree by the University of Michigan.

Experiences in the Port Huron law office influenced Mr. Miller to seek a business career rather than the law, and in 1892 he engaged in the ownership of a cotton plantation in Louisiana. From this first independent business venture he returned to Port Huron in 1894 and until his departure for California in 1896 engaged in the steamboat and domestic fueling business.

Mr. Miller's death was due to septicaemia with which he had been afflicted for two months. Two weeks before he succumbed he had been taken from "Hillside," his home in Pasadena, to the Good Samaritan Hospital in Los Angeles.

## Utilities Must Segregate Merchandise Accounting

The expected order regulating accounting practices of electric and gas utility companies of Oregon for their merchandising and jobbing operations was issued by the state Public Utilities Commissioner on March 29. Prescribing a somewhat more elaborate system of accounting for merchandising than has been in effect heretofore, the order makes its principal departure from previous practice in prescribing that the net profit from merchandise and jobbing shall be included in "income from non-operating property."

The order followed hearings begun in January this year (ELECTRICAL WEST, Feb. 1, 1932, page 97, and March 1, 1932, page 149), and a series of conferences between the complainants, the utility companies and the commissioner, during which stipulations were agreed on to save the time and expense of additional hearings. Complainants were the Merchants Utility Bureau of Oregon consisting of retailers of electrical appliances in the furniture, hardware and department store fields. The original complaint was dated March 1, 1930.

Leading up to its findings the order states:

"The primary object of the utility is to manufacture, furnish and deliver electric energy and gas to its consumers under rates, rules and regulation promulgated by the commission. The sale of certain merchandise is closely linked with the development of the utility business. The business of the utility should be so developed as to fit into the most economical scheme of operation, but the rates of the utility should not be burdened with the cost of selling appliances.

"It is apparent that the utilities are overlooking the primary object of their business and have entered most strenuously into the merchandising field and have not confined themselves to load building equipment but have pushed non-essential equipment by expensive house-to-house canvassing and by other merchandising methods.

"It appears that there should be a segregation of the accounting of the merchandising departments of the power and gas companies from their public utility functions and all items of expense incurred in the merchandising of appliances should be charged to this activity."

The order then repeals the existing form of accounting for merchandising prescribed in the public utility law and substitutes therefor the new classification referred to. It is made effective as of April 1 and requires reports of merchandising and jobbing operations every 90 days.

Although the order is in some respects burdensome, there is no indication that the utility companies concerned will make any objection to it. A practical and intelligent compliance with its terms is held in some quarters to be not in any way inimical to a proper development of the utility business in the state through sound promotion and businesslike merchandising.

## *Window Display Helps Sell Securities*

DURING Public Service Co. of Colorado's spring customer ownership campaign this display window served as the principal publicity agent. Sales approximating 6,388 preferred shares of City Service Co. securities (ten shares of common counting as one share of preferred) were made by a selected group of employees. The company's allotment was 5,000 shares, considered high in view of prevailing economic conditions.

## Common Neutral Approved For Urban Areas

Studies that will enable a net saving to be made in copper and construction costs of the distribution lines of power companies of 5,000 volts or less located in urban areas have been concluded by the California Railroad Commission and the results of the studies approved for inclusion in a general order governing the installation of such distribution power lines.

The object of the study was to determine the practicability of elimination of one wire in circuits of 5,000 volts or less, when in the past two were required.

The obstacle to be overcome was chiefly interference with telephone lines. As the work progressed it attracted national attention. Engineering staffs of public utility commissions and public utilities in many states have been following the study, and are awaiting the findings here before amending their present rules and practices.

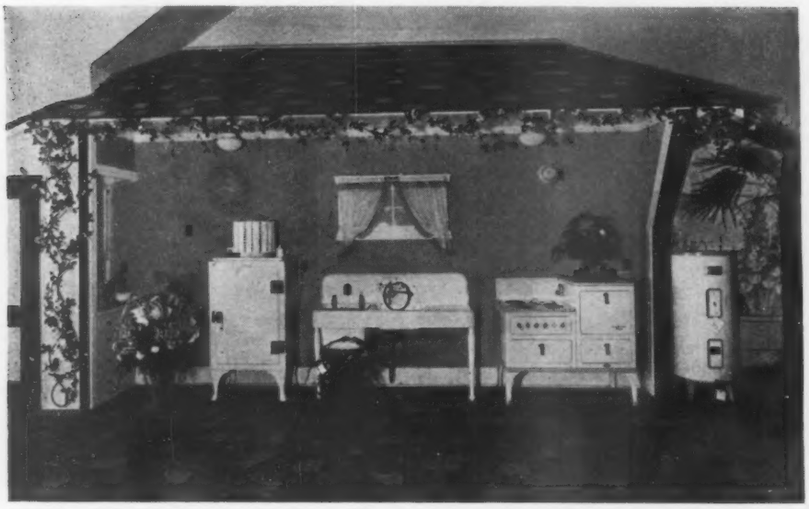
This study was conducted under the general supervision of C. T. Mess, of the engineering staff of the Commission, the data being collected and correlated by engineers of the various utilities involved in connection with telephone company engineers. Tests conducted in eleven districts ranged from 100 to 7,500. This study covered a period of over 2½ years.

A careful study was made of safety requirements in connection with the proposed installation. The study developed that where the definite construction specifications specified by the commission are followed, a common neutral system is as safe for the employees and the general public in all cases and in certain instances is safer than that which is now in service.

Technically, the new installation is described as one combining the neutral conductors of distribution circuits of 5,000 volts or less into one common neutral conductor, and the Railroad Commission approved this class of construction for overhead circuits where economically feasible within the state.

WAY CLEARING FOR START ON SAN GABRIEL DAM—Representatives of Pasadena, Calif., the Southern California Edison Co. Ltd., and the Los Angeles County Flood Control District have reached a tentative agreement which is expected to clear the final legal obstacles to beginning of construction of the county's proposed No. 1 flood control dam in the San Gabriel Canyon. In brief, the agreement gives the county full jurisdiction over all land and property at the site of the proposed dam as a result of relinquishments by Pasadena and the Edison company. The agreement must be ratified by the Pasadena city board of directors, the county board of superivisors and the board of directors of the Edison company. For the relinquishment the flood control district agrees to reconstruct the Edison company's intake and conduit line for the Azusa hydro-electric plant, located north of the dam site. The county also agrees to take over several acres of government land originally granted to the City of Pasadena for its intended use as a part of the proposed Pine Canyon reservoir site.

## *Electric Kitchen Transforms Alcove*



WITH the opening of its new offices in Canon City, Colo., early in the year, the Southern Colorado Power Co. has done its share to reflect the progressive civic spirt of "The City Beautiful," eastern portal of the famous Royal Gorge of the Arkansas River, which is but a mile from the city. This attractive electric kitchen ingeniously utilizes the otherwise waste space under an overhanging stairway in the appliance display room of the new store. The entire office has a garden effect, a local painter having been employed to decorate the walls with flowers.

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## Northwestern Electric Co. Valuation Hearings Open

Adjustment of the book value of the property of the Northwestern Electric Co., Portland, to a figure below that claimed by the company, and attack on the financial structure of the company and of its management contract with the Electric Bond & Share Co., in so far as its relation to rate making is concerned, featured the first week's hearing before the Public Service Commissioner of Oregon on the company's valuation and rates. In this first phase of the case, commencing April 11 on the commissioner's own motion and concluding April 16, only the direct examination of the commissioner's witnesses was heard. A recess of two weeks was taken to give the company time to digest the testimony.

Exhaustive examination of the company's books by the commissioner's staff over a period of several months produced an exhibit containing 1,335 separate items allegedly charged in error as between operating and capital accounts, which had been adjusted by the commissioner in accordance with his views. Principal item therein was one of $255,000, cost of selling preferred stock, which it is claimed was erroneously charged to capital account. Many of the items adjusted occurred prior to the acquiring of the property by the American Power & Light Company in 1925.

The result of these adjustments produced a book value for the company's operating properties of $9,147,718, a figure somewhat below the company's book value. On this adjusted value the commissioner's testimony indicated that net returns since 1915 had ranged from 8.49 per cent to 12.15 per cent, with the return in recent years running from 10 to 11 per cent. It is pointed out, however, that these calculations were tentative, depending on the final outcome of the hearing after testimony from both sides had been presented. It was shown that the reproduction value of the property today would about equal the historical cost.

A particular attack was directed against the 100,000 shares of common stock in the company's financial structure carried on the books at $10,000,000, this figure having been set up by the original owners in return for riparian lands, water rights and various services. The testimony of the commissioner's witness questioned the value represented by this common stock, and pursued the line of reasoning that if dividends had been paid on this stock, as was alleged to have been the case in certain years, then only abnormally high rates could have made such dividends possible.

The testimony also questioned the validity of the contract of the company with the Electric Bond & Share Co. for engineering and other services through which, it was said, $234,000 had been paid in four years. The commissioner indicated that he viewed this payment as of no value to the company and consequently not a legitimate operating expense, but company officials requested that judgment be withheld on this point pending introduction of testimony to show what value has accrued to rate payers from the services furnished by the management company.

## Bonds Offered in Call for Diablo Construction Bids

An ordinance calling for bids on a contract to complete the Diablo power plant on the Skagit River was passed by the Seattle city council last month after having been amended to provide that the Board of Public Works refer all bids to the council for its recommendation before awarding a contract.

Bids are to be submitted to the Board of Public Works on or about May 13 for the following items:

1. Diablo power house superstructure, to be erected on existing foundations. Concrete steel building 65x230 ft., complete with lighting, heating, ventilating, plumbing and fire protection systems.
2. Power house tailrace complete (excavation, concrete lining and deck).
3. Assembly and erection of power house machinery previously purchased and now at the site, including two 67,500-kva. hydro-electric generating units, step-up transformers and auxiliary equipment.
4. The furnishing and installation of switchboards, control wiring, switches and switch structures and other equipment to make a completely operative station.
5. The construction of a 220-kv., double-circuit steel tower line, 5.75 miles in length, from Diablo plant to connect with the existing Gorge transmission line. This item includes furnishing and erection of 19 steel towers, with necessary insulators and hardware. Aluminum-steel conductors and accessories are already purchased, but are to be erected under this contract.
6. The construction of a concrete protecting apron for the north spillway of Diablo dam.

Under the proposed call for bids, the contractor will be required to accept City Light bonds in payment for his work and also to take additional bonds in amount sufficient to pay off the existing indebtedness of the Doablo plant.

Before acting upon the bids for the remaining construction work, the council will have published a call for bids for the sale of $3,200,000 or more City Light bonds to finance the Diablo work, including payment of existing indebtedness.

After bids on both the proposed bond issue and the proposed construction contract have been received, the council will determine whether the low bid for the bonds or the low bid for the contract shall be accepted, or whether all bids shall be rejected, in event the terms proposed are regarded as unsatisfactory.

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P. G. AND E. CO. RATE HEARING TO BE RESUMED JUNE 1—After a brief session on April 20 in San Francisco, the California Railroad Commission continued until June 1 its investigation of electric rates charged by the Pacific Gas and Electric Co. in San Francisco and other Bay cities. The continuation was granted at the request of Dion Holm, attorney representing San Francisco, who stated that additional data are necessary and would take several weeks to compile. Among others who have joined with San Francisco Bay communities in an effort to secure reduction in rates are a number of electric railways in northern California, the California Farm Bureau, the Building Owners and Managers Assn. of San Francisco, the Dry Goods Assn., and the East Contra Costa Irrigation District.

## Tulare Hearing to Be Reopened in June

June 21 has been set as the date of continuance of the hearing held April 1 in Tulare, Calif., before a California Railroad Commissioner, on the application of the City of Tulare to the commission to make an appraisal of the value of the Southern California Edison Co.'s distribution system within the city limits of Tulare. Objections raised at the hearing by B. F. Woodard, assistant general counsel for the power company, caused a continuance of the hearing. Mr. Woodard contended that the ordinance under which the city secured the hearing on April 1 was illegal, and questioned the legality of the hearing before one member of the Railroad Commission instead of the entire commission.

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## Federal Court Upholds Ruling on Gas Rate Cut

Upholding the California Railroad Commission, a statutory court of three federal judges has denied the application of the Los Angeles Gas and Electric Corp. for a permanent injunction to prevent the enforcement of the commission's order for a 9 per cent cut in the company's gas rates. The commission had issued its order on Nov. 24, 1930, the reduction to become effective Jan. 1, 1931. Following the issuance of the order, the Los Angeles Gas and Electric Corp. appealed to the federal court for a permanent injunction, asserting that the commission's order was invalid and amounted to confiscation of property without due process of law.

The company is expected to appeal to the United States Supreme Court.

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## P. G. and E. Downing Plan Now in Progress

Pacific Gas and Electric Co., San Francisco, put into effect on April 1 the "1932 P. M. Downing Electric Load Building Plan" for the sale of ranges and water heaters. During the three months' course of the plan the company's sales efforts will be concentrated particularly on the replacement of competitive fuels. Quotas have been set for sale between April 1 and June 30 of 1,700 electric ranges, 800 electric water heaters, or 2,500 units, a unit being either a range or a water heater. The quotas include sales made direct and those made through a dealer in accordance with the regular P. G. and E. dealer sales plan.

A range or water heater, or a range and water heater, where the two are sold together, will be installed during the campaign for a $10 down payment, with the balance in 24 equal payments. Flat wiring prices are offered to customers where competitive fuels are replaced as follows: In San Francisco, $40 for a range, $20 for a water heater; in Piedmont, Oakland, Berkeley and San Jose, range $30, water heater $20; in all other territory $20 for a range and $10 for a water heater.

The campaign is being backed up by the company with newspaper, poster board and truck banner advertising, window trims, direct mail and bill inserts.

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BUILDING OF HERNDON STEAM PLANT POSTPONED—Construction of the San Joaquin Light & Power Corp.'s steam plant at Herndon, ten miles north of Fresno, Calif., on the San Joaquin River, will be deferred until a date that will bring it to completion in time to handle the peak load demand in 1934, according to A. E. Wishon, president of the company. As a result of the heavy rain and snow last winter, Mr. Wishon said, the company's hydro-electric plants will be able to take care of all demands in the immediate future.

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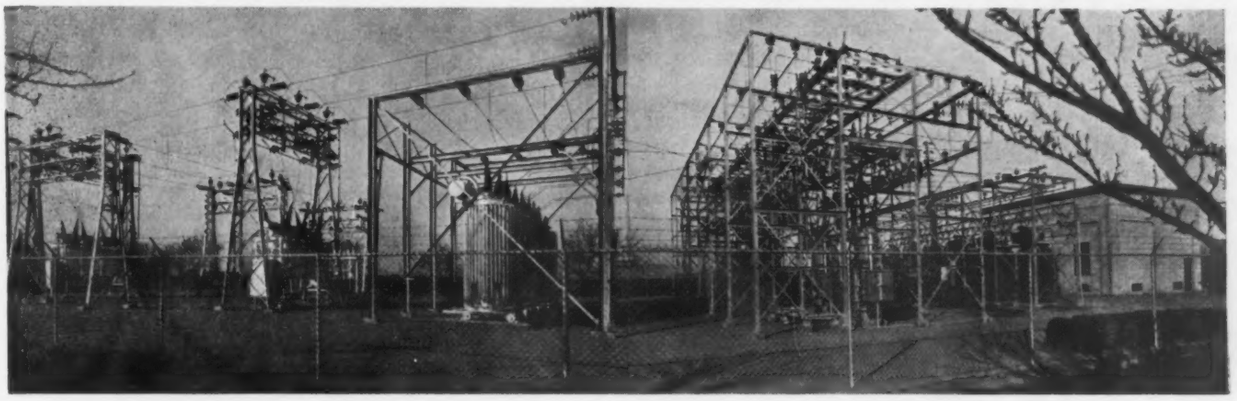
## *Hollister Substation of Coast Counties Gas & Electric Co.*



THIS new 60/24-kv. primary substation at Hollister, Calif., forms one of the principal links in an extensive electrical construction program begun in the fall of 1930 by the Coast Counties Gas and Electric Co., Santa Cruz, and completed in January this year. The project has also included the revamping of existing substations at Gilroy, Morgan Hill and Watsonville in the Santa Clara Valley, as well as the building of a 60-kv. loop system from Morgan Hill to Hollister and from Hollister to Watsonville to connect with the company's original 60-kv. transmission line from Morgan Hill to Watsonville.

Equipment at the Hollister substation makes it one of the most modern structures of its kind on the Pacific Coast. All air-break switches are of the high-pressure contact type. By-pass switches are mounted on top of the structure with grounding switches on their bases. Grounding is effected by closing the grounding switch into a contact mounted adjacent to the contact of the bypass switch, subject to interlocks. Disconnecting switches are mounted on opposite sides of the tower, being operated by means of one operating handle.

All air-break switches are actuated by means of rotary shafts and are hand operated. The galvanized tower structure encloses a motor-operated, 60-kv., 600-amp. oil circuit breaker, frame mounted, with blade and finger type contacts and an interrupting capacity of 500,000 kva. Similar structures enclose duplicate breakers for the Morgan Hill line.

From the transformer breaker structure an aerial bus extends over the transformer structure which encloses four 2,500-kva., single-phase, oil-cooled 60/24-kv. transformers. These transformers are provided with means of air cooling so that at a later date the bank may be increased 50 per cent by adding necessary blower equipment.

The secondary side of the bank of transformers feeds a double-throw switch which is mounted on the 24-kv. switching structure and which permits the feeding of an operating bus or an emergency bus.

The substation building, of reinforced concrete, houses the switch boards, voltage regulator and battery.

This entire project was designed and constructed by the Standard Management and Operating Corp., under the direction of John Collins, Jr., chief engineer. T. H. Underwood was resident engineer and Ray Corwin design engineer.

## San Francisco Utilities Manager Appointed

E. G. CAHIILL, of Cahill Bros., San Francisco contractors, was appointed manager of public utilities by the San Francisco Public Utilities Commission late in March. The San Francisco municipal railway, the San Francisco Water Department, the Hetch Hetchy system, and the municipal airport will be under the management of Mr. Cahill.

E. G. CAHILL
*San Francisco's Utilities Manager*

Mr. Cahill graduated from the College of Mining, University of California, in 1903. He was engaged in mining operations abroad until 1912, when he returned to San Francisco and became a partner with John R. Cahill in the contracting business of Cahill Bros.

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## Pasadena Threatens to Ban Kite Flying

Officials of Pasadena, Calif., have issued a warning that an ordinance against kite flying will be passed unless parents cooperate to prevent children from using wire kite string. The warning followed a near-tragedy in which two 15,000-volt lines fell across a street where two little boys were flying a kite with copper radio wire. The kite wire broke and the portion attached to the kite was dragged across the power lines. It was necessary for police to close the street to traffic until repairs to the line were made, and telephone communication in the area of the trouble was disrupted.

"Unless this practice is halted," City Manager J. W. Charleville was quoted as saying, "we will have to stop kite flying in the city. Such a move would be drastic but we must safeguard the lives of our children. It is not our intention to prohibit legitimate pleasures but, as in the case of the ban on fireworks, when pleasure becomes a menace, we must act."

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SEATTLE MAYOR-ELECT TO TAKE OFFICE JUNE 6—The Supreme Court of the State of Washington has ruled that John F. Dore, who was elected mayor of Seattle on March 8, may not assume that office until June 6, when the term of the present mayor expires. Mr. Dore brought suit immediately upon his election to have Mayor Robert Harlin removed from office on the grounds that he had been appointed merely to fill the vacancy caused by the recall of his predecessor, Frank Edwards.

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## Brawley (Calif.) Gets No Bids for Diesel Plant

No bids were received by the city council of Brawley, Calif., for a diesel engine power plant and municipal distribution system for that city. April 7 had been set as the date for opening bids. A letter was received from the Fairbanks Morse Co. stating that it declined to bid on account of the unfavorable condition of the bond market. As a result, a resolution closing the matter was adopted at a meeting of the the council.

At the same meeting Welburn Mayock, a Los Angeles attorney, submitted a proposal that the city take over the distribution system of the Southern Sierras Power Co. and make a contract with a corporation to be formed by him under which the latter would install diesel engines and lease the distribution for a period of 25 years. This was taken under advisement. It is considered that there is no possibility of this proposal becoming effective because it would be necessary to condemn the property of The Southern Sierras Power Co., which now serves Brawley, a proceeding which would take a long time. A bond issue would also be required, and to this the people are very much opposed.

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## Seattle Defendant in Skagit Flood Suits

Damage claims totaling $60,051 have been filed against the City of Seattle as the result of three floods in the Skagit River Valley and in the city's Cedar River watershed, declared to have been caused by developments of the City Light and City Water Departments.

The commissioners of four dike districts and four individual farmers of the Mount Vernon region filed claims totaling $54,885 for the breaking of dams along the Skagit, attributed to the opening of flood gates in the City Light Department's Diablo dam, about eighteen miles above Newhalem.

In these claims the complainants charge that the washout of their dikes on Feb. 27 could have been averted had the City Light Department not impounded a huge volume of water back of its dam, which was released, they declared, while the floods from the surrounding mountains were running at their highest.

J. D. Ross, City Light superintendent, characterized the Skagit Valley claims as ridiculous, and said the flood damage to the dikes would have been much greater had it not been for the city's Diablo dam.

## Protests Edison Company Water Storage Limitation

Readjustment of storage and riparian rights on the San Joaquin River between the Southern California Edison Company Ltd. and Miller & Lux, Inc., and certain of its subsidiary water companies, is asked in an application filed with the California Railroad Commission by the San Joaquin & Kings River Canal and Irrigation Company, Inc. The latter company operates in Fresno, Merced and Stanislaus counties, serving water to approximately 146,700 acres. The Edison company would benefit from additional water storage rights.

The application asks that the storage limitations now placed upon the Southern California Edison Company Ltd., affecting storage in Florence and Shaver Lakes reservoirs, be made more liberal. The additional storage rights would produce for storage in the lakes additional quantities of water during the low stages of the San Joaquin River flow. The present limitation requires that 5,000 sec. ft. of water be flowing by the Whitehouse gaging station before any water may be stored in the lakes. Under the proposed amendment, storage would be permitted when the flow was not less than 3,000 sec. ft.

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## Commission Rules Against Tillamook Utility District

The Oregon Hydro-electric Commission has reported unfavorably upon a movement for the creation of a people's public utility district in the county of Tillamook. Following investigation of the feasibility of the proposed project, the commission advised the advocates of the district that the development of hydro-electric power plants on Trask River is inadvisable until more complete studies can be made of possible dam sites and stream flow. Such a study, reads the report, would require from three to five years to complete.

In discouraging present creation of the district, the commission points out that such a movement would not be advantageous to the public unless measures could be satisfactorily concluded which would enable the district to acquire ownership of the properties of the Mountain States Power Co., the utility now serving the area under consideration. The commission believes that the people of the district can operate at some profit the steam plant of the Mountain States Power Co., if obtainable by purchase or condemnation at a fair valuation.

"Assuming that financial conditions would permit the sale of necessary bonds," asserts the report, "and that the present plant of the Mountain States company were obtainable at a fair valuation, the people of the district would probably be able to accumulate some profits for investment in further development, hydro-electric or otherwise."

# P. C. E. A.

## Advertising Policies Discussed at Meeting

Last of this year's four meetings of the Advertising-Publicity Section, P.C.E.A., prior to the convention, was held in San Francisco April 15, the attendance being chiefly from northern California. Eugene P. Ramsay, Los Angeles Gas and Electric Corp., section chairman, presided and outlined the plan for the P.C.E.A. convention in June, characterizing it as a "bread and butter" convention. The section's program for the convention was discussed and determined. It was agreed that Henry C. Newton, Los Angeles architect who made such an excellent talk at a previous Advertising-Publicity Section meeting in that city, should have a place on the convention program. His talk will be amplified but will probably bear the same title, "As Ithers See Us."

Three round-table discussion topics held the stage during the afternoon session. Al C. Joy and J. Charles Jordan, both of Pacific Gas and Electric Co., opened discussion on the matter of securing and maintaining newspaper contacts and cooperation in publicity, pointing out the difference in viewpoint between metropolitan and country papers, the difference in story treatment of news, commercial stories obtained in connection with cooking schools, likewise of financial news. In treatment of accident stories or unfavorable publicity it was recommended that newspapers be given every cooperation to get all the facts they want.

A second topic, "Should Advertising Be Placed in Publications Admittedly Hostile?", brought out the general opinion that advertising should be placed in publications regardless of their bias, provided they reach an audience the utility desires to reach; that often hostile newspapers can be beaten in their own columns by well handled advertising.

Alma Freeburg, of the Standard Management & Operating Corp., led an interesting discussion on "Woman—the Domestic Purchasing Agent. Is her point of view sufficiently considered in public utility advertising?" This topic may be made the subject of an article for ELECTRICAL WEST in the near future by Miss Freeburg.

At the previous meeting of the section, in Los Angeles Feb. 18, held jointly with the Advertising-Publicity Section of the Pacific Coast Gas Assn., and attended by a record representation, the discusison topics were likewise of timely and vital interest. Mr. Jordan led a discussion of the topic, "How the Advertising Department Can Help Secure Dealer Cooperation," citing the P.G. and E. Co. dealer tie-in advertising. F. H. Holden, Southern California Gas Co., led a searching questioning of "Has Radio a Place in the Advertising Program of the Public Utility?" R. G. Kenyon, Southern California Edison Co. Ltd., opened the really controversial subject, "How Far Should Advertising Go in Criticizing Competitive Fuels?" This was a heated session, naturally, since both gas and electric advertising men participated. However it was felt to be one of the most constructive things accomplished during the year by the Section. To bring both together to discuss this very topic served to acquaint each with the objectives of the other and to assure both gas and electric advertising men that "war" tactics would do both services harm and neither much good.

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## Convention Plans Taking Shape

Plans for the sixteenth annual convention of the Pacific Coast Electrical Assn., are beginning to take shape with the setting of June 15-17 as the dates for the annual gathering. The Huntington Hotel, in Pasadena, will be the scene of the convention.

In keeping with the spirit of the times, it will be very much a "bread and butter" convention, with a program planned to present and develop a definite contribution to the solution of the difficult problems facing the industry. Among the numerous features of exceptional interest to have a place on the program is the famous General Electric laboratory lecture demonstration, "Adventures in Science," which will be presented by Ellis L. Manning, of the company's research laboratory.

The general convention plan, as at present worked out, provides for five general sessions, one half-day of parallel section meetings, two luncheon meetings, the usual evening public policy meeting, the president's reception, with the annual banquet as the final convention function. The golf tournament has been shifted to Saturday morning, after the official close of the convention. An unusually attractive entertainment program for the ladies also is planned for.

President Addison B. Day has named Daniel L. Scott, of Los Angeles Gas and Electric Corp., to be general convention chairman. Mr. Scott will also act as program chairman. The convention committee, selected by Chairman Scott to handle the details of the gathering, consists of William C. F. West, registration chairman; P. H. Ducker, transportation chairman; Eugene P. Ramsay, publicity chairman; Scott Betts, lighting and decoration chairman; Richard E. Smith, entertainment chairman; C. H. Thrane, vice-chairman; Oscar L. Moore, auditing chairman; Ralph Hopkins, hotel chairman; E. R. Northmore, sports chairman; William Maddock, program manager; E. F. Watkins, attendance manager; and S. E. Gates, special events chairman.

THREE-DAY CONVENTION DECIDED ON —At a recent meeting of the P.C.E.A. general convention committee it was decided to have the annual convention of the association this year extend over three days instead of four. The convention, therefore, will begin on Wednesday, June 15, and close on Friday, June 17, according to Daniel L. Scott, general convention chairman.

# Northwest Association

## Accounting Problems Aired at Meeting

Interpretation of some of the classification of accounts, various problems connected with customers' records, joint use of poles and problems of the small storeroom engaged most of the attention of the accountants gathered at the meeting of the Accounting Section, Northwest Electric Light & Power Assn., at Spokane April 18-19. A slightly smaller attendance than last year made up in enthusiasm what it lacked in numbers, and spirited discussions took place following the presentation of each committee report or paper. An informal dinner on the evening of the first day and inspection of the accounting methods of The Washington Water Power Co., furnished diversion outside of the three business sessions.

Opening the meeting, W. F. Miller, The Washington Water Power Co., chairman, called attention to the multiplicity of problems arising in times of depressed economic conditions, stating that accounting departments took on added importance at such times. He introduced Frank T. Post, president of the company, who discussed some phases of utility operation in which accountants play an important part. Mr. Post's comparison of present-day conditions and those of the panic of 1893-97, drawn from personal experience with that period, left a feeling of optimism. Deploring certain tendencies indicated in recent court decisions and proposed legislation, he expressed the conviction that the sanity of the people in the conduct of their private businesses and in their control of public and governmental affairs would prevail to effect a sound basis of recovery after the force of certain immutable influences had been spent. B. H. Parkinson, Pacific Power & Light Company, vice-chairman of the section, responded to Mr. Post's welcome.

Rates as related to accounting formed a subject outside the reports of committees, and was discussed by G. H. Pike, The Washington Water Power Co. Proving that the electric business was 90 per cent competitive, he showed that rates were limited on the upper level by the value of service determined by the competitive price of other sources of energy and on the lower level by the cost of service. The

accountant's job is to produce records making possible a breakdown of costs so that the rate engineer may know the point below which he cannot go in devising rate structures for competitive business. The practical difficulty in billing and applying some types of theoretically correct rate structures makes close cooperation between accountants and rate engineers desirable, said Mr. Pike. A resumé of committee reports and papers presented at the meeting will be published in the June 1 issue of ELECTRICAL WEST.

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# Economic Studies Feature Northwest Engineering Section Meeting

GATHERING together for the ninth annual meeting of the Engineering Section, Northwest Electric Light and Power Assn., held at Portland April 13-15, Northwestern engineers presented reports covering many problems of the industry, particularly on subjects devoted to economic operation. E. H. Collins, Engineering Section chairman, expressed gratification at the attendance, which exceeded 150. General arrangements were in charge of H. H. Schoolfield and entertainment was provided by a committee headed by E. F. Pearson. A summary of reports presented at the three-day meeting follows:

### Accident Prevention Committee

J. B. FISKEN
*The Washington Water Power Co., Chairman*

A classification of injuries and a compilation of accident experience of member companies was presented by Wallace Brier, Puget Sound Power & Light Co. This paper was a very comprehensive summary of safety activities and will enable a more thorough study of accident prevention means and methods for the coming year. Closely associated with this paper was a report by J. D. Ellis, Northwestern Electric Co., covering the safety activities of member companies.

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### Code Committee

S. B. CLARK
*Northwestern Electric Co., Chairman*

This committee is endeavoring to emphasize the interest of public utilities in the national safety code regulation. The necessity of such interest was brought out in a report by S. B. Clark, Northwestern Electric Co., covering the effect of 1931 code revision in regard to public utility policies and practices. R. E. Thatcher, Puget Sound Power & Light Co., and H. A. Gardner, also of that company, presented a report stressing the need of wiring adequacy in the national safety code and urged that adequacy be defined in its broadest terms so that the market for load-building appliances will not be restricted by lack of outlets.

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### Electrical Apparatus Committee

J. HELLENTHAL
*Puget Sound Power & Light Co., Chairman*

Design and construction of distribution substations was analyzed by F. M. Lewis, Northwestern Electric Co., and A. Shipek, Puget Sound Power & Light Co., in their report on the economical design of substations of 1,500 kva. and less. A demand for reduced distribution cost may be partially met by careful design of this type of equipment to lower first cost and increase the salvage value through a unit construction. A discussion of this report brought out the fact that the manufacturers are now offering enclosed apparatus of a unit type to fulfill the need for a small capacity substation from which a high class of service is demanded. A report by G. M. McClellan, Mountain States Power Co., covered equipment for serving rural lines. A discussion which followed this report indicated the need for low cost but reliable distribution equipment for lines and substations. A need for better regulation of rural circuits was emphasized and it was suggested that the manufacturers should give attention to the problem of supplying this need.

Cooling and ventilating of electrical apparatus was the subject of a report by D. R. McClung, Pacific Power & Light Co. The report precipitated a discussion of the various types of cooling systems now in service in the Northwest and discussion brought out the fact that the re-circulating type was particularly desirable in many localities where excessive dirt is present in the air and is not readily removed by the air-washing method. The latter types, however, have been successfully used by many utilities and industrial plants in this section.

In his study on the obsolescence of equipment, J. C. Henkle, Portland General Electric Co., opened a subject which is of great importance to the electrical industry. The report covered the obsolescence of transformers and circuit breakers. In the case of transformers a thorough analysis of the cost of rewinding or replacement of a distribution transformer was broken down to evaluate the improved efficiencies of the modern equipment. A series of curves was included with the report covering the popular types and sizes of transformers which provide a rapid method of determining the most economical procedure for an individual transformer replacement when the cost of rewinding and the core-losses of the old transformer are known. In view of recent developments in all circuit breaker manufacture, many utilities have found it advantageous to rebuild breakers to include arc-extinguishing contacts, thereby improving their operating characteristics and interrupting capacity. Breakers purchased within the last few years can be reconstructed to include these features at a moderate cost, but in the older types of breakers it is often necessary to increase the stroke, redesign the contacts, and supply new contacts, rods, guides, as well as the parts for arc extinction. With a given cost for all breaker equipment, the rebuilding of circuit breakers provides an economical method of adapting system operation to the demands of modern service and at the same time reduces maintenance, surges due to circuit interruption, and the possibility of breaker failure.

B. C. Russell, Idaho Power Co., made a report on the subject of grounding. In localities east of the Cascade Mountains it is very difficult to secure low resistance ground and the methods of various member companies to secure such grounds were described in detail. It was pointed out that the purity of river water in this section, added to the difficulty of securing an adequate ground for the system and that at the present time most companies operating in this section are using driven ground rods with some form of chemical to reduce the ground resistance.

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### Hydraulic Power Committee

J. E. YATES
*Pacific Power & Light Co., Chairman*

Developments in frequency and load control and the operating experience of member companies of the Northwest with this type of apparatus formed the subject of a report by S. Logan Kerr, I. P. Morris Co., and J. S. McNair, The Washington Water Power Co. Previous difficulties in endeavoring to maintain constant frequency at different parts on a system due to the inability to adjust the frequency controllers to the same load base have been eliminated in the new type of frequency controllers, which are arranged to compensate such differences automatically and cause each controller to seek a common base and reduce the drift between stations to a negligible amount. Maintaining a constant system frequency is necessary not only for electric time keeping and to satisfy the customers' requirements for constant speed, but also necessary for the purpose of stabilizing the generating system and improving the operation of inter-connection and transmission networks. Closely associated with the frequency control is the automatic load control, which provides an economic means of balancing the load so that stations under this type of control operate at a maximum of efficiency. Experience of the companies using automatic operators indicates that system frequency and time regulation is greatly improved, the operating efficiency is improved, and that combinations of these two factors of load and frequency control, such as condenser operation, frequency control, and base load control, make it possible better to adjust our generating stations to system requirements. It was brought out that the interconnection of systems, both of which may employ load and frequency control at one or more stations, is entirely feasible, but that control at each end of tie-lines will greatly improve operation and prevent undesirable drift of load from one system to the other. However, it appears quite possible that operating economies of both systems would be possible in view of the variation in system load curves.

The subject of hydraulic turbine testing was covered by W. A. Hill, The Washington Water Power Co., in his report. The necessity of utilizing water power resources in an economical manner has increased the importance of hydraulic testing and the report covers a discussion of the various methods with advantages and limitations of each. Methods covered include the Gibson method, the salt velocity method, the salt titration method, the Pitot tube method, and the current meter method of water velocity measurement.

Harry Olsen, The California Oregon Power Co., presented a paper covering the methods of forecasting rainfall cycles and their relation to a long-term utility operating forecast.

Protective coatings for hydraulic structures were the subject of a report by J. H. Siegfried, Pacific Power & Light Co. The necessity for some sort of a protective coating for hydraulic structures which are alternately exposed to water and air and weather conditions was brought out. The general practice is to apply a coat of rust inhibiting paint over which is placed a coating of some form of asphaltum paint. The report included tabulation of various member companies and their practices and results in protecting such structures.

A. N. Geyer, Woodward Governor Co., presented a paper on the possibility of using wrought-iron pipes as substitutes for steel plates in penstock construction. The author brought out the fact that impurities often present in steel hasten the rate of corrosion, while wrought iron is conceded to resist corrosion to an exceptional degree. When considering the entire lifespan of a penstock, the added weight of wrought-iron plate to provide the required strength may be evaluated against the maintenance necessary for steel penstocks to prevent corrosion, with the result that the former material might prove more economical in the long run and should be seriously considered as a material for penstock construction.

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### Inductive Coordination Committee

H. H. SCHOOLFIELD
*Pacific Power & Light Co., Chairman*

In a report by C. B. Carpenter, Pacific Telephone and Telegraph Co., and E. W. Conroy, Puget Sound Power & Light Co., a problem of inductive coordination brought about by long exposure of surmarine cables of the utility and the telephone companies was discussed. The undesirable effect of severe acoustic shock was noticed at the telephone exchange when system disturbances occurred on the power company's lines. The methods of eliminating this effect were described in detail in the report.

The effect of radio interference in rural communities remote from large broadcasting stations was reported upon by Ellis Van Atta, Pacific Power & Light Co. In such communities the relatively high noise level and low signal strength serve to accentuate the interference, and complaints from this source have been traced almost exclusively to electrical appliances. In almost every instance the offending appliance was made interference-proof by the application of proper filters and the report suggests that the manufacturers should give greater attention to supplying radio-interference-free appliances even if it is necessary to include filters as standard equipment on their products.

Prof. F. O. McMillan, Oregon State College, presented a progress report on the coordination of high-voltage transmission lines with radio. The laboratory studies made on various classes of insulators and conductors have been carried on for some time and the methods of measuring the corona current were included in the report. So far the most successful methods of reducing radio interference from this cause have been to coat the top of the insulator with some form of metallic paint and apply a similar covering to the wire groove and

other points of contact in the insulator structure. The work on this subject will be carried on throughout the coming year.

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### Meter Committee

A. H. KRUEL
*Portland General Electric Co., Chairman*

Reports of the meter committee were presented by the chairman. L. D. Snow, Puget Sound Power & Light Co., presented a report on the standard practices and requirements for electric meters covering the current practice and characteristics of meters necessary to meet the increased demand of the modern home.

A subject of great interest was presented in a report by W. A. Leidigh, Portland General Electric Co., entitled 'Remote Reading of Watthour Meters." The report covered a proposed method of remote reading of watthour meters over the telephone circuit and involved the use of a special attachment to the meter. A band of high frequencies was superimposed on the telephone circuit, resonance of vibrating reeds corresponding to the meter reading, producing the method of determining the watt-meter reading at the central office. Discussion brought out that there is possibility of a large reduction in operating expense if some method of remote meter reading could be devised which would be satisfactory to all parties involved.

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### Overhead Systems Committee

T. A. PURTON
*Idaho Power Co., Chairman*

A report by C. O. Crane, Idaho Power Co., covered the subject of vibration of transmission line conductors. Mr. Crane has developed oscillographic methods of determining amplitude, frequency, time of vibration, and wind characteristics, which should be of great value in eliminating conductor failure from this cause.

E. C. Starr, Oregon State College, presented a paper on the subject of lightning protection for distribution transformers. This paper dealt with the three-point method of protecting distribution transformers which is now being advocated by the large manufacturers.

Conforming with the trend of reduced operating expenses, a report by P. P. Ashworth, Utah Power & Light Co., covered losses in distribution systems, and the methods of determining each class of loss. A tabulation of the losses in a typical distribution service was included in the report and an analysis of the distribution system energy loss was made by districts. With such an analysis, it is possible to determine at what point reductions may be effected which will result in a more efficient operating condition throughout the system. Discussion brought out the fact that the distribution system was not the only part of the system which should be given study in reducing losses. John Bankus, Portland General Electric Co., brought out the point that system losses were very important, reaching, in some instances, 20 per cent of the total generation. On this basis a net system in-put of 500,000,000 kw.-hr. per year would be equivalent to loss of 100,000,000 kw.-hr. per year, or a continuous load of 11,400 kw. Assuming an investment of $300 per kilowatt for generation, transmission and distribution, it would require an investment of $6,840,000 to take care of the losses. This figure involves approximately $100,000 for fixed charges alone, not including the operating cost to produce the losses.

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### Power Systems Engineering Committee

M. T. CRAWFORD
*Puget Sound Power & Light Co., Chairman*

A report was presented giving the scope of this committee and its value to power company executives for planning system operation. A symposium on the practices of member companies of the Northwest on the subject of system planning for economical transmission, substation and distribution development for rural service was made. This report set forth the necessity for a broad viewpoint in laying out rural lines. Improved service, lowered investment, and the elimination of costly reconstruction are possible if a thorough analysis of probable future load conditions of any given community is made at the inception of the service in any rural area. Discussion brought out the necessity for improved equipment and the cooperation of the engineering and commercial departments to effect the most economical and desirable methods of supplying rural loads.

### Prime Movers Committee

A. H. GREISSER
*Portland General Electric Co., Chairman*

In a report on the present methods of feed water treatment in use in the Northwest, A. L. Pollard, Puget Sound Power & Light Co., brought out the necessity for a thorough investigation of feedwater analysis if costly replacement due to corrosion is to be eliminated. Most difficulties from feedwater in the Northwest are due to elements being carried in solution. The most generally accepted methods of treating feedwater in this territory are the Zeolite, lime and soda in some form, and phosphate methods. Other methods are being used and generally satisfactory results are being obtained. However, the importance of competent chemists and reliable manufacturers was stressed in the paper as a method of obtaining the best results at the lowest cost.

J. A. Hooper, Northwestern Electric Co., presented a report on cinder and smoke elimination covering the methods now in general use in the Northwest in removing cinders from hogged-fuel plants and the commonly accepted practice of smoke elimination.

A. H. Greisser, Portland General Electric Co., presented a report on the costs of diesel electric generating station operation. While the diesel engine is being used to some extent for isolated plants and for small municipalities, such reliable cost data as are available indicate that maintenance, lubricating oil consumption, and relatively short life increase the cost of the diesel generated kw.hr. to a point which is hardly competitive with utility service. The necessity for treating water to prevent scales forming on the diesel water jacket often increases the installation cost to an almost prohibitive figure.

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### Underground Systems Committee

C. H. HOGE
*Puget Sound Power & Light Co., Chairman*

A report on small-town street lighting was made by Craig P. Elliott, West Coast Power Co. This paper stressed the need for proper street lighting in the small town as a method for promoting safety and convenience at night as well as improving the appearance of the community. However, as the financing of such a system is ordinarily difficult, the paper suggested methods of selling adequate ornamental street lighting to such a community. These methods include a company finance plan by which the community buys adequate street lighting and not kw.-hr.; by lowering the original investment required, and by advocating the use of lamps smaller than ordinarily recommended. Under the first plan the company undertakes the entire installation, operation and maintenance of the system. Methods of reducing the initial investment were described and included the use of one transformer for both ornamental and overhead systems, the omission of series transformers in the standards substituting the lower priced film protectors, and reducing the costs of installation of ornamental poles and brackets.

Wallace Quistorff, Puget Sound Power & Light Co., presented a report on the operation and maintenance of a.c. underground networks. The paper included the details of operation and maintenance of this system and stressed the necessity for periodic inspection and checking of relays and switches. A tabulation of inspections, troubles originating on the underground network, and some of the defects which were found from inspection were included in the paper. Corrosion due to temperature changes was found to be somewhat prevalent in network relays and it was suggested that an investigation of some means of eliminating this trouble be undertaken by the manufacturers in cooperation with the utilities. The demand of utility management for lower distribution investments, with the concurrent agitation for the elimination of overhead lines by various residential communities, has led to the study of an underground distribution system for residential districts, which was the subject of a report by T. W. Schwartz, Northwestern Electric Co. This report includes the details of a proposed low cost underground distribution system which consists of buried cables, transformers, and the elimination of the conventional manholes. Charts and drawings are included in the report to bring out the details of such a system to show that it is feasible to make repairs and locate troubles. Such a system is estimated to cost about 50 per cent more than the overhead distribution system, but to be much less than the conventional type of underground system with cable ducts and manholes.

# Meetings

## Northwestern Electric Elects Trustees

At the annual stockholders' meeting of the Northwestern Electric Co., Portland, held in Vancouver, Wash., the latter part of March, all former members of the board of trustees were re-elected except Herbert Fleishhacker of San Francisco who had requested that he be not re-elected because of his inability to attend board meetings. Kenneth D. Dawson, president, States Steamship Co., Portland, was elected in Mr. Fleishhacker's place.

Trustees re-elected were: Guy W. Talbot, president of the company; John A. Laing, vice-president and general attorney of the company; L. H. Hoffman, contractor, Portland; and M. M. Conner, attorney of Vancouver, Wash.

At the first meeting of the new board all former officers of the company were re-appointed.

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OAKLAND CLUB ELECTS OFFICERS—Officers elected by the Oakland (Calif.) Electric Club for the new club year are as follows: President, Clark Baker, Sr.; vice-president, H. A. Knudsen, electrical engineer, East Bay Municipal Utilities District; secretary-treasurer, David Kilgour, Pacific Gas and Electric Co. The directorate consists of E. G. Bartlett, Westinghouse Electric & Mfg. Co.; Thomas Janes, Department of Buildings and Grounds, University of California; Carl Hardy, chief of the Department of Electricity, Oakland; H. G. Keesling, Pacific Gas and Electric Co.; and A. R. ("Gus") Kolls, NePage-McKenny Co.

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## *Coming Events*

**American Institute of Electrical Engineers**—Annual Pacific Coast convention, Vancouver, B. C., Aug. 29-Sept. 2, 1932.

**Illuminating Engineering Society**—Twenty-sixth annual convention at New Ocean House, Swampscott, Mass., week of Sept. 26, 1932.

**International Association of Electrical Inspectors, Northwest Section**—Seventh annual convention at Wenatchee, Wash., Sept. 6-8, 1932 (tentative).

**Southwest Section** — Convention at Santa Barbara, Calif., Sept. 12-14, 1932.

**National Electric Light Association**—Annual convention and exhibit, Atlantic City, N. J., June 6-10, 1932.

**Rocky Mountain Division.**—Annual convention at Stanley Hotel, Estes Park, Colo., Sept. 12-14, 1932.

**Pacific Coast Electrical Assn.**—Annual convention at Huntington Hotel, Pasadena, Calif., June, 15-17, 1932.

SAN JOAQUIN OFFICERS ALL RE-ELECTED—At the annual meeting of stockholders of the San Joaquin Light & Power Corp., held in Fresno, Calif., April 12, all officers of the company were re-elected. These include: chairman of the board, A. F. Hockenbeamer, San Francisco; vice-chairman, A. G. Wishon, Fresno; president, A. E. Wishon, Fresno; assistant to president, E. P. Smith, Fresno; vice-president, P. M. Downing, San Francisco; vice-president and assistant secretary-treasurer, W. E. Durfey, Fresno; secretary-treasurer, D. H. Foote, San Francisco; controller, E. W. Hodges, San Francisco; assistant secretary-treasurer, Charles L. Barrett, San Francisco; assistant secretary-treasurer, M. S. Babcock, Fresno; assistant secretary, J. D. Rosie, San Francisco; assistant treasurer, E. J. Beckett, San Francisco; and assistant treasurer and cashier, O. H. Barthol.

SHORT-WAVE POLICE RADIO SET DEMONSTRATED—A demonstration of the new short-wave police radio set was presented at a meeting of the San Francisco Electrical Development League, March 28. Ralph Wiley, chief of the Department of Electricity, City of San Francisco, explained the set technically, and Chief of Police Quinn showed its practical application. He sent out a call for four of the 35 radio-equipped police cars to report at the Palace Hotel where the meeting was being held. The first of the cruising cars reported 1 min. 35 sec. after the call had gone out and all four had reported within 3 min. The first department also has 35 cars radio-equipped. Harrison Holliway, manager of Station KFRC, acted as master of ceremonies.

SEATTLE CLUB TO HOLD GOLF TOURNAMENT IN MAY—The ninth annual golf tournament of the Electric Club of Seattle will be played on a local course during May. Reno Thatcher of the Puget Sound Power & Light Company is chairman of a committee in charge of plans. He will be assisted by Grover Burke of the City Electric & Fixture Co.; A. J. Lutz of the General Electric Supply Corp., and Norman L. Bost of the National Electric Products Corp. Play will be for the Harry J. Martin cup, with a number of prizes offered for special events.

COLORADO LEAGUE CONFERENCE TO BE REPORTED NEXT MONTH—A report of the seventh annual state-wide electrical conference sponsored by the Electrical League of Colorado, held in Denver on April 27, will appear in the June 1 issue of ELECTRICAL WEST.

OFFICERS RE-ELECTED BY P. G. AND E. CO.—No change was made in the directorate of the Pacific Gas and Electric Co. at the stockholders' annual meeting held April 12 in San Francisco, and all of the present officers were also re-elected at a meeting of the new board held immediately thereafter.

# Personals

## F. D. Weber Elected President of I.A.E.I.

FRED D. WEBER, chief electrical engineer, Oregon Insurance Rating Bureau, has been elected president of the International Assn. of Electrical Inspectors, whose headquarters are in Chicago. Mr. Weber succeeds R. H. Manahan, of Los Angeles.

Another Westerner who appears among the international association's officers is C. W. Mitchell, chief electrical engineer, Board of Fire Underwriters of the Pacific, San Francisco, who is fouth vice-president of the association.

Mr. Weber is also secretary-treasurer of the Northwestern Section, I.A.E.I., which will have its annual convention at Wenatchee, Wash., Sept. 6-8. He expects to visit other section meetings of the International, to be held this fall as follows: Southwestern Section, Santa Barbara, Calif., Sept. 12-14; Western Section, Grand Rapids, Mich., Sept. 19-21; Eastern Section, New York City, Sept. 26-29; Southern Section, Richmond, Va., Oct. 3-5.

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## John Cooper Now Manager Of Colorado League

THE recent appointment of John J. Cooper as executive manager for the Electrical League of Colorado brings to the organization a man whose ripe maturity and all-round experience in the electrical industry make him more or less a traditional figure.

There is probably no Mountain States contractor, dealer, manufacturer's representative, salesman or central station operator of the current generation who can remember back to a time when John Cooper was not a prominent figure in Colorado's electrical picture.

Arriving in Denver from Greensfield, Indiana, in his latter teens, with all his worldly possessions in a large telescope, the boy John was surprised to find a white man's city instead of Indian tepees. Needing an income to finance a meal ticket, he sought and landed a stenographic job with an electric firm. That berth fixed his destiny. He has been doing things electric and in an electric way ever since, including operation of several small central stations throughout the state.

When the Electrical Cooperative League was formed twelve years ago in Denver, Mr. Cooper was already a veteran in the industry by virtue of many years' association with the Mountain Electric Co., a wholesale house of which he was then sales manager. He was president of the Electrical Cooperative League when it incorporated as Electrical League of Colorado in 1930. Dating back to the early 1900's, the Electric Club, a social group, was formed with John Cooper a moving spirit, before there was a Denver Chamber of Commerce.

In 1928, the Mountain Electric Company, of which Mr. Cooper was president, merged into the General Electric Supply Corp. After less than two years' service as division manager for the new firm, he affiliated with the Hurley Machine Co., becoming manager of the Intermountain division. He resigned this position to accept managership of the Electrical League of Colorado on March 1.

Among other affiliations, Mr. Cooper is past president of the Colorado Electric Light Assn., being qualified for membership by years spent at utility operation in Trinidad, Grand Junction, Gilpin County and other Colorado points before and while he was engaged in the jobbing business.

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## Manager of W. W. P. Co.'s Coeur d'Alene District

RICHARD H. McKAY, electrical engineer for The Washington Water Power Co., Spokane, has been appointed district manager for the company at Coeur d'Alene, Idaho, replacing J. W. Voellmeck, resigned. The appointment became effective April 1.

Mr. McKay has been in the employ of The Washington Water Power Co. in the engineering department since 1921, following his graduation from Columbia University with the degree of electrical engineer. During the past two years he has spent much time in

F. D. WEBER

JOHN J. COOPER

RICHARD H. McKAY

the study of water systems in the territory served by the company, which operates both the electric service and water systems in Coeur d'Alene. He is a member of the A.I.E.E. and chairman of the Associated Engineers of Spokane.

Mr. Voellmeck was district manager at Coeur d'Alene when the properties there were acquired by the American Power and Light Co. in 1929, having been connected with the properties since 1908.

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ELLIS L. MANNING, of the General Electric Research Laboratory, Schenectady, has been selected as one of the principal speakers at the convention of the Pacific Coast Electrical Assn., to be held at Pasadena, Calif., June 14-17. Mr. Manning's address, "Adventures in Science," will describe and demonstrate many things known to science but rarely understood by the majority of people. He will demonstrate the peculiar properties of the electron, radium and uranium. Demonstration equipment for the talk consists of about 25 large crates and requires 36 hours for preparation. While on the Pacific Coast Mr. Manning will deliver several lectures in California as follows: May 24, 8 p.m., Fulton Theater, Oakland; May 26, 8 p.m., Stanford University; May 31, 8 p.m., Scottish Rite Auditorium, San Francisco; June 3, 8 p.m., Elks Club Hall, Sacramento; June 6, 8 p.m., College of Pacific, Stockton; June 9, 8 p.m., Municipal Auditorium, Fresno.

ROME C. SAUNDERS, formerly of the executive office of the Puget Sound Power and Light Co., Seattle, has become associated with the San Francisco office of Henry L. Doherty & Co., with headquarters in the Mills Tower in that city. This company is the investment branch of the Henry L. Doherty utility interests. Mr. Saunders has spent 22 years in the employ of utility companies under Stone & Webster management, and from 1913 until the present time had been connected with such properties in the Northwest.

J. W. RYALL, formerly associated with the Central Electric Supply Co., Denver, Colo., has resigned to join the organization of the B. & R. Electrical Supply Co. in that city.

A. R. MILLER, assistant manager of the Pacific Coast Division of the National Carbon Co., Inc., San Francisco, has been transferred to the company's Portland office. He is succeeded in San Francisco by L. J. Kerlin.

LUTHER J. LEE, for many years assistant to the late John B. Miller, chairman of the Southern California Edison Co. Ltd., Los Angeles, has been appointed assistant to the president, Russell H. Ballard.

E. C. BOSSLER, former resident engineer in Seattle for Curtis Lighting Inc., Chicago, has been transferred to New Orleans.

# Obituary

## Death Ends Long Career of Charles C. Moore

CHARLES C. MOORE, 63, president of C. C. Moore & Co. Engineers, San Francisco, Western representatives for the Babcock & Wilcox Co. and

CHARLES C. MOORE

numerous other manufacturers of kindred equipment, died April 17 at his country home in Santa Cruz, Calif., of cerebral hemorrhage.

Mr. Moore was born in New York State, but came to California as an infant with his parents. He graduated from St. Augustine's College, Benicia, Calif., at 15, and in 1885 entered the employ of the San Francisco Tool Co. as a mechanic. He succeeded to that company's business when, in 1902, it was reorganized as C. C. Moore & Co. Engineers, specializing in motor power and hydraulic work. He remained president of that company until the time of his death.

Mr. Moore's activity had been devoted primarily to steam power plants for many years and pioneering projects he built in this field are now in operation throughout the Far West. Representative steam plants of his construction include a plant built for the Independent Electric Light & Power Co., which is now Station "A" of the Pacific Gas and Electric Co., San Francisco; a power plant for the Spreckles Sugar Co., Salinas, Calif.; plant for the Southern Pacific Terminal Co., Galveston, Texas; in 1906 and 1907 a steam plant for H. E. Huntington, Pacific Light & Power Co., now the Redondo Beach steam plant of the Southern California Edison Co. Ltd.; and the original steam power equipment in the Long Beach steam station of the Edison company.

Always prominently connected with local and state civic activities, Mr. Moore became nationally known as the president of the Panama Pacific International Exposition in 1915. He was president of the San Francisco Chamber of Commerce from 1908-09, and at the time of his death was president of the Society of California pioneers. Recently he had assumed the chairmanship of Mayor Angelo Rossi's citizens committee to campaign for the $6,500,000 Hetch Hetchy bond issue to be placed on the May 3 ballot, and a short time ago was appointed chairman of the California commission to the 1933 Chicago Century of Progress Exposition. He was a charter member of the San Francisco Machinery Dealers' Assn.; a member of the San Francisco Engineers' Club and the Engineers' Club of New York.

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SAMUEL ADAMS CHASE, special representative of the Merchandise Sales Department of the Westinghouse company, died April 12 at Mansfield, Ohio. Mr. Chase, who was an honorary member of the Association of Electragists-International, was well known to the electrical industry on the Pacific Coast. For years he toured the United States talking before industry groups on the theme, "Live and Let Live." During the past 25 years he had worked ardently to bring about harmony among all branches of the industry.

HALFORD ERICKSON, vice-president in charge of operation, Byllesby Engineering & Management Corp., died April 7 at his home in Oak Park, Ill. As chief operating executive of all subsidiary utility properties of Standard Gas and Electric Co., Mr. Erickson occupied a prominent position in the public utility field. He was well known as an authority on utility regulation and on holding company control and management, as well as on franchise, valuation and rate questions.

ALBERT E. DRENDELL, secretary-treasurer of the Decker Electrical Construction Co., San Francisco, died in that city April 25. Mr. Drendell was the founder of the Drendell Electrical Mfg. Co., which he later sold to the Trumbull Electrical Mfg. Co., the local company now being known as the Drendell-Trumbull Electrical Mfg. Co., but Mr. Drendell was not affiliated with it at the time of his death. He was a past vice-president of the San Francisco Electragists.

ARTHUR ROBERT THOMAS, for the past year statistician for the Tucson Gas, Electric Light & Power Co., Tucson, Ariz., died as the result of injuries received in an airplane accident which occurred on March 19 in the San Bernardino Mountains, Calif.

Ralph L. Robinson, sales executive of the Babcock & Wilcox Co., New York, lost his life in the same accident.

HENRY BLACK JAGOE, president and founder of the wholesale electrical and radio firm of Radio Sales Service Ltd., of Vancouver and Victoria, B.C., died at his home in Vancouver March 28 following a short illness. Mr. Jagoe came to Vancouver eight years ago, after having previously engaged in business in New York for 40 years.

## Contractor Dealer Inspector

### Electragists Combine Boatride and Meeting

Reviving an old California custom, the California Electragists, Northern Chapter, reverted to their annual boat ride up the Sacramento River to Sacramento for their spring convention, April 1-3. With the entire lower deck of the river steamer *Delta King* to themselves, and a representative list of electrical contractors, wholesalers, manufacturers and central station men in attendance, the successful convention was started.

The first meeting was called to order by President Edward Martin, Sterling Electric Co., San Francisco, at 10 o'clock at the Hotel Senator, Sacramento. A large attendance of Sacramento and Stockton contractors, and a delegation from the Southern California Electrical Contractors and Dealers Assn., consisting of H. H. Walker, president, F. J. Connolly, executive secretary, and L. H. Ellet, representing the motor group, were in attendance.

Frank Kiefer, northern regional manager, Pacific Coast Electrical Bureau, opened the meeting with a description of the particular activities of the Bureau which are building up the wiring market. He described the additions to the Red Seal Plan recently authorized and cited concrete examples of benefit derived by contractors from Bureau work. He was followed by K. I. Dazey, managing director of the Bureau, who spoke on the cooperative phases of activity and cited the self-interest of contractors in Bureau work.

Walter Campbell, secretary of the Sacramento Builders Exchange, talked briefly, outlining that city's remodeling and repairing campaign, and showed the part the electrical industry played in such work-creating programs.

Ralph S. Bowdle, district supervisor for the Contractors' Registration Bureau of the State Department of Professional and Vocational Standards, the administrative body handling the California contractors' license law, was the next speaker. Mr. Bowdle touched on several important points which needed strengthening in the present law, notably the improvement of the bid-peddling situation. He urged the representation of electrical contractors on building groups working with the Legislature in these improvements to the Act and answered a great many questions relative to individual problems.

Glenn Slater, deputy director of the Department itself, then came in and spoke briefly to the assembly. He strengthened a number of points made by Mr. Bowdle and pledged the sincere enforcement of the Act provided contractors gave the Department the opportunity to help them.

A discussion subject on rewiring, planned for this open meeting, was dispensed with on account of the lateness of the hour.

The afternoon session was a closed one for contractors only. The meeting was opened with the reading of an interesting letter from a former contractor, titled "The Electrical Contracting Business as a Hole." Following this there was strong opinion expressed for the need of a field representative for the Northern Chapter to organize and strengthen the association. Various personal phases of manufacturers' distribution, wholesaling problems, legislation, price data book, and the national association activities were dealt with in the meeting.

A strong protest was voted to be sent to the bonding companies calling attention to the fact that they are practically in competition with contractors in the financing of unreliable contractors. They are to be asked to investigate much more thoroughly those for whom they provide bonds.

At the election of officers for the new year Tom Harris, of the H. S. Tittle Co., San Francisco, was named president. He was vice-president last year. Lloyd Flatland, of the Globe Electric Co., president of the San Francisco Electragists, was named vice-president, and Edward Martin temporary secretary.

The very successful convention and boat ride arrangements were headed by a committee consisting of Charles Shipman, Atlas Electric & Engineering Co., San Francisco; Spencer Moore, P. G. and E. Co., and George Smith, Smith Electric Co., San Francisco.

### *Heads San Franciscans*

*Lloyd Flatland, whose whole family operates the Globe Electric Works, San Francisco and San Diego, now heads the San Francisco Electragists as president and was elected vice-president of the California Electragists at the Sacramento convention*

### *Mayor of Stockton*

*Conn Franke, active electrical contractor of Stockton, was named its mayor at the last election. He has long been active in civic affairs. He is the second electrical contractor to hold this honor. Grover Grider, now a councilman, was mayor of Stockton at one time*

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### League Sponsors Own Electrical Show

People are definitely interested in electrical things. This conclusion was reached unanimously by the members of the Santa Clara County (Calif.) Electrical Development League after its very successful electrical exposition at San Jose, April 13-16, 1932. Surprising as it was to the participants, approximately $3,000 in sales were made right from the floor to the 12,000 people who visited the exposition during its four-day run.

The exposition was conducted entirely by the league and not by a newspaper, as so many such shows are, and therefore was in the control of the electrical industry in all particulars. The participants in the exhibits were:

L. H. Bennett Co., Ltd.; Ralph Berggren; Coast Electric Co.; Nathan Dohrmann Co.; Guilbert Bros. Electric Co.; Buckeye Refrigerator Agency; King-Russell Electric Co.; Northern California Electric Refrigeration Bureau; Roy M. Butcher; L. Hart & Son Co.; General Vacuum and Washer Co.; Osen Motor Sales Co., Inc.; The Westinghouse Store; Frigidaire Agency; University Electric Co. of Santa Clara; Fred Doerr; Garden City Electric Co.; Meade Motor Works; and Mission Electric Co. The Pacific Gas and Electric Co. also played a leading part in the publicity and program arrangements.

Home economists who gave cooking lectures and demonstrations were Mrs. A. V. Farnsworth, Miss Grace Bull, Mrs. M. M. Ritter and Miss Loretta La Marr.

A feature of the show was a cake baking contest run along usual cooking school lines, cakes being sold later by the Home of Benevolence. Prizes of various kinds were arranged.

An interesting departure in procedure was that of allowing the winners of the major prizes a selection within a certain price range or to apply that amount upon any appliance wanted but which sold for more than the prize total.

Because it was an electrical industry show as well as an appliance exposition, there were exhibits not usually found at newspaper shows. The Meade Motor Works had a well arranged exhibit showing the winding and repairing of electric motors. Roy M. Butcher, electrical contractor, had a large display of wiring features, special conveniences for home electrification. The Mission Electric Co. displayed a built-in, remotely controlled radio system for a home, whereby loud speakers can be plugged in anywhere in the house and stations selected by means of a push button board attached to a tape, which also can be plugged in to special outlets. Guilbert Bros. had an unusual neon sign display. Coast Electric Service Co. displayed water systems and pumps. P. G. and E. Co. demontrated a new kitchen lighting unit, dairy sterilizer steam tanks, and ranges.

A public address system had been installed by Roy Butcher and was used during all the stage demonstrations and musical numbers. A revolving beacon on the roof of the skating rink, which housed the show, attracted attention throughout the city.

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ENTERPRISE ELECTRIC WORKS, at 1164 Mission St., San Francisco, recently named as president and manager E. J. Douglas, for many years connected with the firm as salesman and estimator. J. M. Hanley was named secretary and treasurer and A. J. Von Ahn, vice-president. The latter is in charge of the shop and repair department of the company. The company is one of San Francisco's pioneer electric motor and industrial contracting firms.

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## *Committeeman*

*George Smith, one of the active committeemen who made the boat ride of the Electragists to Sacramento a big success. Mr. Smith is THE Smith of Smith Electric Co., San Francisco, and formerly was president of the San Francisco association*

## Begin Campaign Against Substandards

Continuing its campaign to outlaw non-standard electrical cord, devices and appliances, Southern California Chapter, International Assn. of Electrical Inspectors, sent a resolution to 25 organizations and trade associations concerned in southern California. Cities operating under the standard electrical ordinance of the Southwestern Section, I.A.E.I., already have means of regulating the sale and installation of such non-standard electrical goods. The success of this campaign will be watched with interest by all branches of the industry. This action was taken at the last session of the Southern California Chapter in Los Angeles City Hall, March 18.

Discussion on Section 503 (p) of the 1931 National Electrical Code resulted in action being taken to secure a uniform interpretation as follows: "Lead-covered conductors will be required only in feeders and sub-feeders subject to permanently wet conditions."

James M. Evans, electrical engineer, Board of Fire Underwriters of the Pacific, gave an installment of his discussion on code changes. The meeting adjourned after its routine business to take a factory inspection tour. The next regular meeting is tentatively scheduled for May 20, as announced by Theodore C. Combs, secretary.

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## *Motor Minded*

*E. J. Douglas and Horace Adams are president and manager respectively of the Enterprise Electric Works and the Farnsworth Electric Co., both motor firms of San Francisco and two of the longest established industrial wiring contracting businesses in that city. Mr. Adams is president also of the Motor Dealers' Assn.*

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THE RUST ELECTRIC CO., Seattle, has moved its office and shop from 1908 Boren Ave. to larger quarters at 2224 Second Ave. The firm, headed by F. W. Rust and E. L. Burroughs, has been in business in Seattle for twenty years. It is now engaged in electrical wiring in the new federal marine hospital under construction in Seattle.

ZAMBONI BROS., specialists in electrical pumping and dairy machinery in the dairying section of Hynes, Calif., have remodeled their store, warehouse and shops at 260 South Paramount St. About 700 sq.ft. of floor space is used for the display of electric refrigerators, motors and pumps. Four glassed-in offices are used for accounting, estimating, consulting and radio. Across the street the annex accommodates the machine shop, pipe shop and motor winding shop.

THE ENCOURAGING STATEMENT was made by L. M. Ryerson of the Standard Furniture Co., Seattle, that by late April their volume of sales of electrical appliances, including major and small appliances, since the first of the year, had exceeded that of the same period in 1931. By volume is meant units sold. The price per unit was, however, lower and, with no increase in spread, profits were somewhat behind. The experience of this large retail store goes to show that sales are on the increase, and with adjustments in prices to come, prospects will be brighter.

NEPAGE-MCKENNY CO., Portland, has been awarded the electric wiring contract for the new federal building, Portland, to occupy the block bounded by Sixth, Broadway, Salmon and Main Sts.

NEW FRIGIDAIRE headquarters in San Francisco have been announced by the Frigidaire Sales Corp. An attractive showroom has been set up at 1400 Van Ness Ave., corner of Bush St., for a complete display of Frigidaire models. Open house followed the grand opening on April 23.

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## Endorsement Given Uniform Ordinance

Results of a ballot vote taken among the active members of the Southwestern Section, International Assn. of Electrical Inspectors, on the uniform ordinance recommended by the Pacific Coast Electrical Bureau, have been announced by Claude W. Mitchell, secretary of the former organization. One hundred and thirty-one ballots were sent out, of which 98 were returned. Of this number, 89 were cast in favor of the uniform ordinance and nine against. The executive committee of the Southwestern Section considered this as an endorsement of the ordinance by that organization.

Although the ordinance and the vote taken upon it will be sent to the international executive committee for approval, the Pacific Coast Electrical Bureau considers this endorsement on the part of California inspectors as sufficient for all practical purposes in the promulgation of the ordinance in cities desiring new ordinances in this region. The uniform ordinance is designed to be offered to any city or county requiring an electrical ordinance or to any city revising its present ordinance.

## Manufacturer Distributor

### G.E. Announces Four-Year Refrigerator Guarantee

A four-year service plan, protecting the new purchaser of a General Electric refrigerator against all costs on the mechanism for four years, was announced April 18 by P. B. Zimmerman, general manager of the electric refrigeration department of the General Electric Co.

The introduction of this new four-year guarantee was accompanied by the launching of a special half-million dollar trade paper, magazine, newspaper and outdoor advertising campaign throughout the United States.

Mr. Zimmerman's announcement reads, in part, "During the past four years the public has invested more than $300,000,000 in General Electric refrigerators and the unparalleled performance record which has been established in more than 1,250,000 homes has made it possible to place in effect this new four-year, cost-free service plan . . . . Just a short time ago, satisfied as to the dependability of the performance of our machine, we offered an additional two-year guarantee beyond the previous one year warranty, the first such step taken in the electric refrigeration industry. Now, after 20 years' research and more than four years' use in homes the world over, General Electric offers a service contract protecing the owner against all service and repair charges on the 'Monitor Top' mechanism for four whole years."

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F. A. LAVIGNE WITH ELECTRICAL MATERIAL CO.—F. A. ("Tony") Lavigne, formerly sales engineer with the Associated Wholesale Electric Co., Los Angeles, selling Line Material Co. products, has associated himself with Frank Hurst in the conduct of The Electric Material Co., Inc., of San Francisco. This company is representing the following manufacturers' lines: Ward Leonard dimmers, resistors, etc., in the San Francisco territory; Roller-Smith circuit breakers and electrical measuring instruments, and Edwin L. Wiegand Co.'s Chromalox heating strips and units throughout California; J. C. Chesler & Sons' line of store window reflectors in the San Francisco territory. Mr. Lavigne was at one time sales engineer for the Westinghouse company in San Francisco, handling sales of safety switchboards and panelboards, safety switches, interior lighting equipment and outdoor floodlighting.

THE LOUIS ALLIS CO., motor manufacturer of Milwaukee, Wis., has appointed Sterling Electric Motors, Inc., as its sales representative on the Pacific Coast.

### Dominion Electric Buys Majestic Appliance Co.

Announcement has been made of the purchase of the Majestic Electric Appliance Co., of San Francisco, by the Dominion Electric Appliance Co., of Minneapolis, Minn. Following the purchase, the Majestic company has been reorganized and will operate as an independent unit of the Dominion Electric Co. Manufacturing and sales headquarters will be at 590 Folsom St., San Francisco.

E. N. Brown, president of the Majestic Electric Appliance Co. until March, 1928, has returned to the company and will be entirely responsible for sales policies and activities. He states that a straight jobber policy will be followed by Majestic in the merchandising of its line of electric waffle irons, automatic and non-automatic toasters, electric air heaters and water heaters.

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GRAYBAR HANDLING MILLER ULTRA-VIOLET LINE—The Graybar Electric Co. has been appointed distributor of the complete Miller line of ultra-violet Sunlite equipment in the eleven Western states, according to announcement of Henry C. Hubley, Western sales manager for The Miller Co.

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## Chamblin-Thomas Co. Formed to Represent Monarch Ranges and Other Lines

A MERGER of two well-known and active personalities into one firm while each of the partners retains his identity as a separate representative for other lines has been in the process of formation for several months in San Francisco and is now officially announced by Clyde L. Chamblin and H. M. Thomas. The firm is known as the Chamblin-Thomas Co. and has been organized for the purpose of representing manufacturers of electrical merchandising lines. Through this partnership arrangement the Chamblin-Thomas Co. will be California central station representative for the Monarch electric range. Besides this, it will handle the line of sunlamps and floor lamps manufactured by Luminator, Inc., of Chicago, in the northern California territory, and will represent the Thomas A. Edison, Inc., line of Edicraft appliances throughout California.

Glenn L. Brown, factory sales supervisor for the Malleable Iron Range Co., Beaver Dam, Wis., manufacturers of the Monarch range, will continue to supervise all sales of these ranges in California, but will, by this arrangement, be able to devote more time to the development of the retail dealer outlets. The Chamblin-Thomas Co., on the other hand, will concentrate on utility business exclusively.

Organization of the Chamblin-Thomas Co. will not interfere with other representation of both principals of the company. For example, Clyde Chamblin will still retain the management of the California Electrical Construction Co., an electrical contracting firm with which he has been associated for many years. This construction company will handle installation work as in the past. Besides this, arrangements have just been completed for the California Electrical Construction Co. to handle Duplexalite commercial lighting units for the San Francisco Bay area. George J. Raab, who has been representative for the Duplexalite Division of The Miller Co. of Meriden, Conn., for this territory, is now associated with the California Electrical Construction Co. in charge of this special department. John Maddox, Duplexalite sales manager in Los Angeles, also has joined the San Francisco organization. Wiring devices, sundries and other similar merchandising items, formerly carried by this company, will be continued at the rear of the show room for Monarch ranges at 639 Mission St. This company also has the official repair shop for Bersted and Edicraft appliances in northern California.

Clyde L. Chamblin under his own name has been representative for California of the Automatic Electric Heater Co., manufacturer of Sepco water heaters, and will continue the service and sale of these appliances as formerly.

H. M. Thomas will continue as manufacturers' representative for Schweitzer-Conrad, Inc., the Burndy Engineering Co., the States Co., Russell-Stoll and other related lines of engineering items for central stations and engineering use, and will move from his former location at 163 Second St. to the new Chamblin-Thomas headquarters.

Both men are well known in the electrical industry in California. Clyde L. Chamblin has been active in contractors' affairs throughout his life and has many times been president of both the northern California and the state association of Electragists. He has been national president of the Association of Electragists-International and at the present time is northern regional manager of the Pacific Coast Electrical Bureau. He is a past president of the San Francisco Electrical Development League and of the San Francisco Contractors and Dealers Assn.

Harry Thomas, likewise, has been very active in association work in California, especially in the Pacific Coast Electrical Assn. At the present time he is a member of the finance committee of the Pacific Coast Electrical Bureau and of the agricultural, air conditioning, electrical apparatus and meter committees of the P.C.E.A. He distinguished himself particularly as convention manager under Al C. Joy at the last convention of that association at Del Monte. He is a director of the San Francisco Electrical Development League.

## Henderson, Southard Form San Francisco Alliance

C. F. Henderson and James H. Southard, manufacturers' representatives covering central and northern California and Nevada, have announced their consolidation as the Henderson-Southard Co., with offices at 600 Call Bldg., San Francisco. The consolidation will become effective May 1. The new organization will represent the following manufacturers: Weston Electric Instrument Corp., Jewell Electric Instrument Co., Esterline-Angus Co., American Transformer Co., Racon Electric Co. and Western Electro Mechanical Co.

C. F. Henderson individually will continue to represent the following companies: Electric Controller & Mfg. Co., Electric Machinery Mfg. Co., Terry Steam Turbine Co., Kuhlman Electric Co., Cleveland Worm & Gear Co., Griscom-Russell Co., Electric Furnace Co., General Control Corp., Marshall Electric Co. Mr. Southard has been representing the Weston Electric Instrument Corp., and Mr. Henderson the Jewell Electric Instrument Co., which has recently been purchased by and consolidated with Weston.

A. Honeychurch, repair representative for Weston, and L. C. Tobin, who has been operating as the Jewell Laboratory, have merged as the Pacific Electrical Instrument Laboratory and will handle all repair service work for both Weston and Jewell products. Their laboratory will be maintained at the offices of the Henderson-Southard Co.

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## Prices Reduced on Leading Refrigerators

The trend in electric refrigerator manufacture, as with many other commodities, is toward economy, and material price reductions have been announced by two leading makers, while a third has brought out a supplementary line at lowered prices.

Prices of all General Electric refrigerators, both domestic and commercial models and units, have been reduced from 5 to 23 per cent. "These reductions," said P. B. Zimmerman, manager of the General Electric Refrigeration Department, Cleveland, Ohio, "accompany the general downward trend of costs throughout the world and in no measure affect the quality of our product. General Electric refrigerators now carry an unqualified four-year gauarantee against all service expenes.

"The tremendous purchasing power of the General Electric Co. coupled with the lower cost of raw materials has enabled us to pass on this saving to purchasers of our product, a practice we have always pursued and which we shall continue to follow."

The Kelvinator Corp., Detroit, has just announced price reductions on all of its seventeen domestic models and on commercial condensing units, reductions ranging up to $100 on the largest models. "We know that these price reductions have been made in line with the lower price trends of the whole refrigeration industry," said George Marsch, of Sherman, Clay & Co., northern California Kelvinator distributors. "At the same time the new prices open up a large field of prospects who will purchase at the lowered figures," continued Mr. Marsch. "The new prices placed on the Kelvinator lines do not mean that there will be any sacrifice of the quality and workmanship of the cabinets and refrigeration units."

Frigidaire recently brought out a new line of "Moraine" refrigerators, priced from $160 f.o.b. Dayton, in which the essential change from higher-priced Frigidaires is in the Duco finish of cabinet exteriors.

"In merchandising the new models, quality will be the dominant sales appeal," said E. G. Biechler, president and general manager of the Frigidaire Corp. "They represent the best equipment our engineering and manufacturing divisions have been able to produce in the lower price range without the sacrifice of structural features, and they will be promoted on a quality basis as a supplementary line to our porcelain models, which retain a number of exclusive features in addition to their porcelain finished exteriors and larger ice capacity to account for the price spread," said Mr. Biechler.

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## Electro-Kold Taken Over By E. S. Matthews, Inc.

The assets of the Electro-Kold Corp., whose headquarters, both office and factry are in Spokane, were purchased at an assignee's sale on March 25 by E. S. Matthews, Inc. The business will be actively continued by that company, and most of the manufacturing personnel of the former company has been re-employed. The manufacturing building at 151 South Post St., Spokane, has been retained by the Matthews company, and new refrigerator models are now in the process of development. The factory branch office at 2214 Fourth Ave., Seattle, is being retained. Distribution throughout the rest of the Pacific Coast will be handled through distributors and dealers.

The officers of E. S. Matthews, Inc. are: president, E. S. Matthews; vice-president and treasurer, D. W. Mather; plant superintendent, Harry Gale; secretary, I. M. Brown. A. A. Wilson is sales manager.

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## *Apex Salesmen at Spring Sales Rally*

WHEN Pacific Coast district managers of The Johnson Washer Co. attended a spring sales convention held recently at the company's factory and general offices at Oakland, Calif., they were put through a course of lectures on washers, ironers, vacuum cleaners and refrigerators, open discussions, written examinations and a trip through the factory. Then the men donned dungarees and got their hands all greased up while they learned what made the wheels go round in the washers. First showing of the company's new Apex refrigerator was made at the convention.

Photographed at the meeting are (top row, left to right) J. F. Stephens, Jr., sales promotion manager; F. L. Tomaschke, president, Tomaschke-Elliott Advertising Agency; R. E. Kortepeter, Western Division sales manager; W. A. Goodman and Earl Peacock, district managers, southern California; and H. D. Rice, district manager, Metropolitan Los Angeles. Bottom row: District Managers R. S. Harrington, Salt Lake City; G. E. Tribble, San Francisco; F. B. McCord, Portland; C. L. Tribble, Oakland; H. D. Lent, Seattle; and R. P. Downing, Fresno. Inset: G. B. Schuyler, vice-president and general manager.

## Company Formed to Distribute Copelands

Copeland-Schlageter Co. has been organized by G. O. Schlageter, its president, to handle the distribution of Copeland refrigerators in southern California and Arizona. Headquarters have been established in the Overland Terminal Bldg., 1807 East Ninth St., Los Angeles. J. M. Tenney is general sales manager, and the parts and service department is under the direction of Larry Robertson.

With a completely rounded organization, the Copeland-Schlageter Co. has made provisions to carry out an aggressive and practical plan of dealer cooperation. A merchandising and training school has been established for dealers and salesmen, and a separate school for supervisors and field men is also maintained. Well appointed display rooms, with a complete showing of all fourteen Copeland models, are available for use of their dealers who wish to demonstrate models not carried in stock. A special feature of the new merchandising plan is a localized advertising service for dealers.

Jay Kennedy, Pacific Coast regional manager for the Copeland Co., will make his headquarters with the Copeland-Schlageter Co. when he is in Los Angeles.

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KELVINATOR SALES CORP. has announced the appointment of the Sullivan Valve & Engineering Co., Butte, Mont., as distributor of Kelvinator refrigerators in Montana, southeastern Idaho and northern Wyoming. The Hennessy Co. and Barclay Motors, Inc. have been appointed dealers in Butte, succeeding the Montana Hardware Co., which is retiring from the electrical refrigeration field. Under the new sales plan the Sullivan Valve & Engineering Co. will cooperate with 31 other Kelvinator dealers in the territory in the merchandising of the Kelvinator line, and the department in charge of this work will be headed by Leon Hampton, a former Kelvinator distributor in western Washington. Dewey Martin, until recently associated with the Montana Hardware Co., has been made service manager in charge of commercial sales.

H. H. OLDFIELD, formerly sales manager of the Com-Fo-Lator Co., Ltd., a division of Smoot-Holman Co., Inglewood, Calif., has been appointed Pacific Coast factory representative of the Airgard Corp., of New York, manufacturers of an air filter for homes and offices. Mr. Oldfield will have his headquarters in Los Angeles. The appointment was made during a recent visit to the Pacific Coast of W. B. Connor, president of the Airgard Corp.

THE STANDARD ELECTRIC STOVE CO., Toledo, Ohio, has appointed H. R. Curtiss & Co., of San Francisco, northern California distributor of Standard ranges.

DIAMOND TAKES OVER ELECTRO CHIME—Diamond Electrical Mfg. Co., Ltd., Los Angeles, announces that on March 1 it completed arrangements to manufacture, distribute and market the complete line of home and office chimes formerly made in Los Angeles by Electro Chime, Ltd. These chimes, which are attached direct to the wiring system, requiring no motor, will be sold under the trade name of Diamond E Electro Chimes. The Diamond company states that before acquiring this new line an exhaustive research dealing with chime design, operation and salability was conducted. The company intends to offer every merchandising and advertising assistance to distributors and contractors in marketing the chimes.

EASY SALES TAKEN OVER BY EDISON CO.—The merchandising department of the Southern California Edison Co. Ltd. has taken over direct sales of Easy washers and ironers in Edison company territory in southern and central California. Sales in this territory formerly were under the direction of the California Household Utilities Corp., Los Angeles. W. H. Gribble, who has been in charge of Easy sales for the California Household Utility Corp., has joined the Edison company organization and will continue in charge of washer and ironer merchandising. Sales specialists of the Easy organization also have been transferred to the Edison company's merchandising department.

ROBERT B. TEMME CO., 756 Broadway, Tacoma, has been appointed exclusive Pierce County (Wash.) distributor for General Electric refrigerators. The company will handle a complete line of both home and commercial units. Associated with Mr. Temme will be Frank A. Lough, former salesman for the Pacific Power & Light Co. at Walla Walla, Wash., with seven years' experience in refrigeration; N. V. Tegler, manager of the products department; and E. E. Scribner, head of the commercial department.

ELECTRIC REFRIGERATION BUREAU'S estimated figures for domestic electric refrigerator sales during January and February show that 86.5 per cent of quota was sold by the nation as a whole during that period. The goal suggested for the first two months of 1932 by the Bureau was 90,008 sales, and 77,780 units were actually placed. Nine states exceeded their individual quotas.

INTER-MOUNTAIN ELECTRIC CO., Salt Lake City, has been appointed by A. J. Lindeman & Hoverson Co., Milwaukee, distributor of the complete line of L. & H. products, including ranges, water heaters, air heaters and appliances, in Utah, eastern Nevada, southeastern Oregon, western Wyoming, and that part of Idaho south of Lewiston. Announcement of the appointment was made by P. F. Ross, L. & H. Western division manager.

# Market Review

*California and Intermountain—*

MARCH and early April are generally conceded to have been most discouraging months, wiping out the slight gains of the year, and renewing the round of salary cuts and personnel adjustments which many had hoped were past with 1931. However, late April showed a little pickup and the customary seasonal crop and climatic factors are just beginning to record themselves. Brisk winds, for example, are drying out the ground so fast that some good pumping business is predicted for May.

Building construction continues to decrease, the following tabulation giving an interesting comparison for the three leading California cities (Los Angeles, San Francisco, Oakland) for the first quarter of 1932, 1931 and 1930.

| | L.A. | S.F. | Oak. |
|---|---|---|---|
| | % | % | % |
| Decrease of 1932 over 1931 | 38 | 49 | 70 |
| Decrease of 1931 over 1930 | 41 | 7 | 9 |
| Decrease of 1930 over 1929 | 27 | 22 | 21 |

Electrical sales have decreased about 45 per cent in the Pacific Northwest over last year, 35 per cent in southern California, 25 per cent in northern California, and about 50 per cent in the mountain area centering around Salt Lake City.

Collections are about 20 per cent poorer during the same period. Certain wiring staples, such as flexible metallic conduit and rubber-covered wire, have raised about 5 per cent in response to factory costs, but profit rate on minimum buying units such as the coil or carton is giving considerable concern.

Specific business now being placed, however, is varied and of fairly good values, including a $45,000 underground distribution system for the Sunnyvale dirigible base, divided about equally between conduit, cable and miscellaneous supplies; a $6,500 Westinghouse switchboard and panel for a San Francisco health building; 100 hp. of assorted elevator motors, sizes 1½ to 15, equipped with magnetic brakes for stage operation, value $6,000; and a $50,000 fixture order for the San Francisco War Memorial.

Special lighting shows considerable sectional activity, with Westinghouse reporting orders totaling $37,000 covering posts, tops and transformers for San Jose and the Peninsula, and the Pacific Gas and Electric Co. securing figures for floodlighting its headquarters building, requiring about 125 large units totaling close to $10,000. The project of lighting a San Francisco golf course has also been revived.

Overseas business has been hampered by the Chinese conflict, which has

diverted several shipments from their destination, but Philippine business has been fair and Hawaiian ordering very good, including such central station and plantation machinery as $15,000 of transformers and feeder regulators, a $40,000 substation equipment consisting of six 500-kva. Westinghouse transformers, 12 induction regulators, two 11-kv. oil circuit breakers; and $5,000 of circuit breakers and lightning arresters. Westinghouse also reports a $12,500 export shipment of miscellaneous motors, sizes 5 to 100 hp., three 25-kva. and two 200-kva. transformers, and an electric bake-oven, all for a varnish plant.

Power company business includes considerable range activity on north and south campaigns, and such specific orders as 1,000,000 ft. of assorted guy strand, sizes ¼ to 7/16 in. for annual requirements of Los Angeles; 1,000 treated poles for the Reno and Truckee district; a $3,500 carload of copper wire, sizes 2 to 8, for Burbank; $20,000 of G.E. network protectors, and $17,000 of G.E. circuit breakers and parts for the central California area.

*Pacific Northwest—*

NO particular improvement in sales of electrical apparatus, motors, schedule materials, ranges and domestic appliances was reported by Seattle jobbers and dealers during April, although, it was stated, the volume compared favorably with March. There is but little optimism manifested, the majority of firms reporting indications for spring and early summer business far from bright. Inquiries have been extremely light and few of those received during late March and early April materialized into orders. Collections are reported from poor to fair.

Specifications have been issued to Seattle jobbers by the Washington Pulp & Paper Co., of Port Angeles, covering between $18,000 and $20,000 worth of electrical equipment for a projected sawmill to be built this spring at Port Angeles, the plant to be utilized in breaking down logs which will be converted into pulp and paper. Approximately 75 motors, including one 300-hp. machine, and three 150-kva. transformers are included in the order which is to be placed.

Sales reported during the month by one firm included 50 motors from 50 hp. down to irrigation and refrigeration sources; 10 transformers from 5 to 50 kva.; 300 meters from 5 to 25 amp. to local central stations; and switchboard and control apparatus costing about $10,000 to Great Falls, Mont., for a municipal water system.

Another Seattle jobber reported 40 motors from 100 hp. down (majority 25 hp. and under) to woodworking plants and miscellaneous industrials; another 60 machines from 5 to 50 hp. to agricultural and irrigation sources; another one 60-hp. machine to a pulp mill and 30 motors, from 25 hp. down, to lumber mills for replacements; and a manufacturer's agent four 50-kva. and 10 10-kva. transformers for Federal building jobs in Seattle and Portland.

Bids were opened on April 19 for approximately $3,500 worth of switches and a switchboard for the new substation at the McNeil's Island federal pentientiary, but no award has been announced.

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## Barometer

ELECTRICAL energy consumption in various Western industries indicated that the general average of activity in this part of the country during March was 16 per cent less than it was a year ago and 6 per cent less than in February, after adjustment is made for the difference in the number of working days. The latter decline is not abnormal; data for other years show a similar characteristic, but when the first quarter of the year is viewed as a whole the decrease from 1931 is evident. Further analysis reveals a virtually steady condition since the middle of 1931, whereas prior to that time the trend was definitely downward.

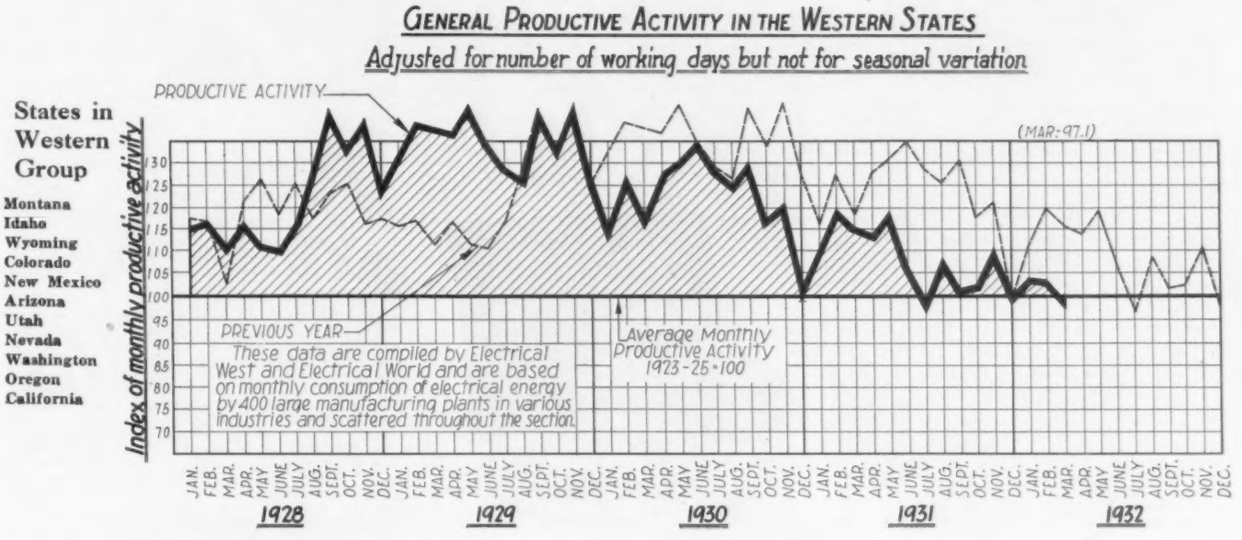
Compared with March, 1931, there have been improvements in chemicals and in the paper and pulp industry; shipbuilding is about on last year's level; the manufacture of food products is down 22 per cent, forest products 14 per cent, the metal and rubber industry each 34 per cent, the stone, clay and glass group 18 per cent. Compared with the preceding month a moderate advance is indicated in paper and pulp and in rubber products.

### Indexes of Manufacturing Activity in the Western States

(All figures adjusted for number of working days)

| | 1932 March | 1932 February | 1932 January | 1932 March |
|---|---|---|---|---|
| All industry | 97.1 | 103.7* | 104.0 | 115.7 |
| Chemicals | 81.6 | 91.6* | 92.0 | 71.8 |
| Food | 116.8 | 127.0 | 129.0 | 148.4 |
| Forest products | 130.0 | 135.2 | 136.0 | 152.1 |
| Metals group | 42.1 | 49.7* | 45.3 | 64.1 |
| Paper and pulp | 132.3 | 121.4* | 121.0 | 125.3 |
| Rubber | 102.5 | 98.1 | 103.7 | 155.0 |
| Shipbuilding | 88.0 | 87.4 | 96.7 | 88.7 |
| Stone, clay and glass | 78.0 | 80.8* | 83.5 | 94.9 |

* Revision.



# New Products

## *"Tricold" Refrigerator*

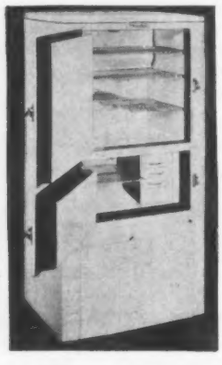
An entirely new principle of electric refrigeration, it is claimed, is introduced in the new "Tricold" refrigerator brought out by the Tricold Refrigerator Corp., 296 Delaware Ave., Buffalo, N. Y.

In this new refrigerator, instead of the usual food compartment, two compartments, completely insulated from each other are used—a larger upper compartment for food storage and a smaller, lower compartment for freezing, quick-chilling and frozen storage. Another radical change is the building of the freezing unit into the lower freezing compartment, instead of in the food storage chamber.

The food storage compartment is refrigerated by a special fin-type cooling coil of its own, this cooling coil, it is explained, being designed to produce a sustained 40-deg. temperature at normal humidity. Defrosting of the coil, therefore, is not necessary, since no frost collects.

Two sizes of the "Tricold" refrigerator are offered—one for larger families and one for families of average size.

To meet the demand for a refrigerator of lower price, the company is offering the "Chilldare," as a companion line. The "Chilldare" is of conventional design. By running the freezing coils under and over each tray, the manufacturer claims to provide fast freezing without excessive distribution of sharp cold through the food storage compartment. Temperature control, dehydrating pan, rubber and chilling trays are standard equipment. The refrigerator is built in four sizes—with 4.50, 4.87, 6.17, and 7.90 cu. ft. capacities.—ELECTRICAL WEST, May 1, 1932.



## *Grinnell Washers*

A complete new line of washers at prices ranging from $59.50 to $109.50 (Eastern) is announced by the Grinnell Washing Machine Corp., Grinnell, Iowa.

Leader of the new line is a "Spin-Dry" washer which will retail for $109.50. This washer will have the 100-year Laundry Queen washer equipment as well as a new simple spinner-extractor drier. Grinnell engineers state that a pencil may be stood on the "Spin-Dry" while it is in operation and the vibration will be so slight that the pencil will not fall over. This model is finished in two pleasing shades of blue.

Grinnell will also have three submerged agitator wringer washers. The Laundry Queen Regal model, retailing at $59.50, has a Lovell wringer with balloon rolls, full capacity porcelain tub, large four-blade submerged agitator, direct drive, Durex oil-less bushings on all moving parts, ¼-hp. Westinghouse motor, and four strong channell steel legs with heavy double guards.

The Laundry Queen Monarch, retailing for $69.50, has special Lovell wringer, balloon wringer rolls with safety hand rest, large four-blade submerged agitator and new silent drive. The manufacturer points out that this model offers the dealer an opportunity to step up a prospective buyer from the $59.50 washer to the $69.50 Laundry Queen Monarch with a resultant increase in his profit. Both this and the Regal are finished in Nile green with mottled green porcelain tub.

Third of the new wringer-type washers is the Laundry Queen De Luxe model (illustrated) which retails for $79.50. It has a particularly handsome Lovell wringer with oversized balloon rolls, latest hand rest and safety features. All the washer's metal parts are chrome plated or enameled a pleasing shade of blue. Its large porcelian tub is mottled blue a shade lighter than the blue of the base. The De Luxe model was designed to offer an exceptional value at a price that would make it easy to sell, with a margin that will give the dealer a worth-while profit, according to the company's announcement.—ELECTRICAL WEST, May 1, 1932.

## *Heater Cord Set*

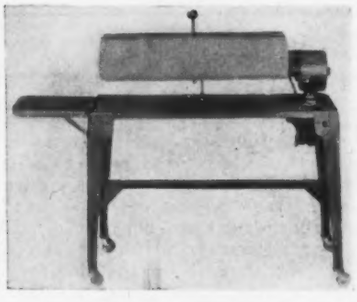
Six features of a new "Guaranteed" heater cord set announced by Cutler-Hammer, Inc., Milwaukee, Wis., are stressed by the manufacturer as follows: Nonbreakable rubber attachment cap with long, convenient hand grip, firmly attached contact blades and neat appearance. Superflexible cord, extra long (7½ ft.), extra strong (10,000 cycle test), has the highest rating given by the Underwriters' Laboratories. Trouble-proof connector plug of special Thermoplax which will not disintegrate under appliance heat. Contact clips are of brass with an auxiliary steel spring to give uniform and permanent grip of contact posts. Locking screws hold connector body together permanently; it will not loosen in use.

This new cord set is guaranteed by the manufacturers against all ordinary defects in workmanship and materials, also against breakage of the attachment cap, burnout of the contact clips, breakage of the connector and breakage of the cord in normal use. Its rating is 10 amp., 125 volts; 5 amp., 250 volts—suitable for the new type 1,000-watt electric flatirons. The set comes packed in individual boxes, wrapped in cellophane, with ten boxes in a three-color display box for counter or window.—ELECTRICAL WEST, May 1, 1932.

## *Barcol Electric Fans*

Changes in design and construction, together with improvements in appearance, characterize the 1932 series of Barcol fans made by Barber-Colman Co., of Rockford, Ill. Outstanding changes in the 8-in. size are the new aluminum propeller, improved motor construction, and a new ornamented base. The 6-in. fan will continue unchanged except for the improved motor now used in all Barcol fans.

Three types are offered in the 8-in. fan: (1) a plain single-speed model without switch, (2) a single-speed model with an "off-on" switch mounted on the motor case, and (3) a two-speed fan with a "high-low-off" regulating switch on the motor case. The 6-in. fan (illustrated) is furnished in the single-speed switchless type only. Standard color of molded parts of all 1932 Barcol fans is mahogany brown, and, with the exception of the aluminum propeller of the "eight," all visible metal parts are cadmium plated.—ELECTRICAL WEST, May 1, 1932.



## *Easy Ironer*

The Syracuse Washing Machine Corp., Syracuse, N. Y., manufacturers of Easy washers and ironers, announces the addition of the Model 30 Easy ironer to its line of fully automatic ironing machines.

This new model is mounted on a two-tone green steel table with extension drop leaf. It is equipped with "finger-tip control" and easily operated roll-stop device that is standard on all Easy models. The 26-in. roll is fully open at the left end and the 1,200-watt shoe has extra heat at the open end to provide higher ironing temperature at that point where most ironing is done. Western retail price, $74.50.—ELECTRICAL WEST, May 1, 1932.

## *"Photoflood" Mazda*

The Westinghouse Lamp Co., 150 Broadway, New York, announces a Mazda "Photoflood" lamp having an A-21 inside frosted bulb, over-all length of 9 15/16 in., medium screw base, and is designed for 105-125 volt service. List price is 35 c. each.

The Mazda Photoflood lamp is particularly suited as a companion lamp to the Photoflash lamp for taking still pictures and is a convenient and powerful light source for taking home movies. It can be placed in any house lighting socket or fixture, the lamp shades acting as reflectors, but for best results photographic reflector equipment is recommended.

Due to a high operating temperature of the filament, the Mazda Photoflood lamp has a short life, averaging 120 minutes at 115 volts. Approximately 3,000 feet of 16-mm. motion pictures at normal speed can be made during the life of one lamp.—ELECTRICAL WEST, May 1, 1932.

## *"Firefly" Alarm Clock*

An illuminated-dial alarm model, appropriately named the "Firefly," has been added to its line of synchronous electric clocks by the Hammond Clock Co., 2915 North Western Ave., Chicago.

The soft glow of the dial of this new clock is provided by a novel method: The material of which the dial is made is translucent and the light is behind the dial. Light is supplied by a 2½-volt lamp, controlled by a switch so that it may be turned off in the morning. The clock has a molded ebony finish case and curved glass face surrounded by a chromium plated bezel. Height is 4¾ in., width 4 in. Intended retail price is $4.75. The clock is being introduced to the retail trade in a special combination offer with models in the company's higher priced non-stop bichronous line.—ELECTRICAL WEST, May 1, 1932.

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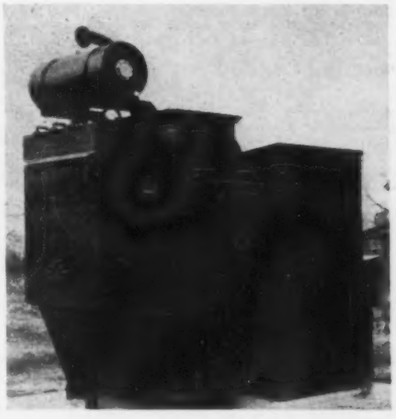

## *"Packaged" Substation Units*

Cost of distributing electric power to areas of low load density is reduced by a new substation equipment that has been announced by the General Electric Co. The transformer and switchgear are designed as a unit and assembled at the factory. This gives an opportunity to reduce the total installed cost and results in low maintenance charges, small space requirements, and interchangeable equipment in case of future expansion. The design permits additional feeders to be provided at a minimum of expense, makes an exceptionally good appearance because of the absence of an overhead structure, and allows the total installed cost to be esimated easily and accurately for budgeting purposes.

The equipment includes a three-phase transformer, with a high-voltage oil-immersed disconnecting switch, an enclosed high-voltage fuse compartment, a complete automatic equipment for changing the ratio of the high-voltage winding under load, and the necessary switchgear. Included in this are a panel with voltmeter, ammeter and watthour meter, the current and potential transformer, oil circuit breaker, relays, disconnects and fuses.

The transformer has provisions for connecting a high-voltage underground cable to a pothead on the disconnecting switch compartment. The switchgear compartment can be arranged for connecting to low-voltage overhead feeders through the roof, or to underground cables in the base.

The entire equipment is metal-enclosed. Space required for the transformer and switchgear, for one feeder, is approximately 12 x 10 ft. Each additional feeder position adds approximately 2½ ft. to the 12-ft. dimension.

The standard kva. capacity of the transformer is 750 as a self-cooled unit. This capacity can be increased to 940 kva. by the addition of air-pressure-cooling equipment if future requirements demand.—ELECTRICAL WEST, May 1, 1932.

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## *Insulated Flashlight*

For use by linemen, trouble shooters and other power company employees the French Battery Co., Madison, Wis., has perfected the Ray-O-Vac insulated "Rotomatic" flashlight. Through an exclusive process of rubber plating, all metal parts of the case are insulated, the insulation adhering to and becoming an integral part of the case. Dielectric tests running as high as 29,000 volts have failed to penetrate the insulation. The rubber plating has withstood severe impact and abrasive tests with absolutely no evidence of chipping or cracking. This extra-heavy insulation gives added protection to the case when handled roughly or thrown in with other tools.

The switch unit is guaranteed against breakage, but all parts—switch, case, lens or bulb—can be easily and inexpensively replaced.

The Ray-O-Vac flashlight is available in two sizes: two-cell and three-cell—and in two types: floodlight and spotlight. The floodlight type is most generally used in power houses and substations, where diffused illumination is desired. The spotlight is preferred by linemen and trouble shooters. A clip hanger permits the insulated case to be attached to the belt. A double clip also is available for carrying the case on the steering column of an automobile or cross-bar of a bicycle.—ELECTRICAL WEST, May 1, 1932.

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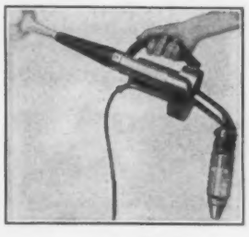
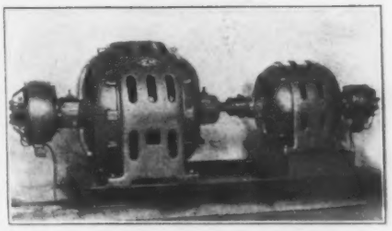


## *Premier Moth Destroyer*

The necessary equipment for moth-proofing with dichloricide (paradichlorobenzene) is now included by The Premier Vacuum Cleaner Co., of Cleveland, Ohio, with its Premier Spic-Span cleaner at no extra charge. The moth-destroying equipment is comprised of a large glass container for dichloricide, a molded rubber connector to hold the bottle against the nozzle of the cleaner and a soft rubber blower tool for directing the dichloricide as it leaves the cleaner. When the Spic-Span is set up as shown in the accompanying illustration and the switch turned on, the suction draws the dichloricide crystals up through the fan chamber where they are ground into a very fine white powder and carried out through the exhaust orifice and the blower tool connected at the point where the bag was removed. —ELECTRICAL WEST, May 1, 1932.



## *Frequency Changer Sets*

To provide means of obtaining alternating current at frequencies either above or below those of the usual 60-cycle source, the Electric Machinery Mfg. Co. offers a line of synchronous motor-driven frequency changers for use with such equipment as vibrators, vibrator conveyors, special woodworking machines, welding machines and induction furnaces.

The set illustrated furnishes power for thirteen vibrating conveyors. The motor is rated 50 hp. to operate on 60-cycle current at unity power factor. The alternator is rated 125 kva. to deliver 30-cycle current. The power factor of the load on the alternator is very low and the latter is designed to carry 25 kw. at 20 per cent lagging power factor. The speed which gives lowest first cost with this combination of frequencies is 900 r.p.m. and the set was built accordingly, the motor having eight poles and the alternator four poles.

In order that the generator excitation may be varied without changing the motor excitation, each machine is furnished with its own exciter, which is direct connected to the shaft. The low power factor of the load is not transmitted back to the plant supply system as it is carried by the alternator. Rather, the set has the effect of raising the plant power factor due to the unity power factor characteristic of the synchonous motor. If desired the motor may be designed for leading power factor operation with more power factor corrective effect. Frequency changer sets can be supplied to give any frequency desired for the operation of special commercial apparatus. ELECTRICAL WEST, May 1, 1932.

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## *Water and Dust Tight A.C. Manual Starter*

Class 2,510 W6, a compact and rugged a.c. manual starter of water and dust tight construction is announced by the Industrial Controller Division of the Square D Co., 710 S. Third St., Milwaukee. This three-pole starter is designed to control across-the-line single and poly-phase motors of 2 hp. or less. It is particularly suited to packing plant, creamery, flour mill, cement plant, foundry and similar applications where extreme moisture and dust conditions are encountered.

In addition to the water and dust tight construction, other outstanding features are push-button operation, low price, and compactness without sacrificing wiring space. Overload protection is provided by time-limit overload relays which are front reset and require no replacement of parts after operation. Tripping of either relay opens all three lines. Approximate dimensions are 4⅜ in. wide, 8¾ in. high, and 6 in. deep.—ELECTRICAL WEST, May 1, 1932.

## *Watertight Couplings*

New conduit couplings and connectors just introduced by Appleton Electric Co., Chicago, are furnished with a round steel wire ring and flat brass ring, making connections absolutely watertight. Couplings in the line have a hexagonal center portion, permitting them to be held rigidly with a wrench when connecting lengths of threadless, thin-wall conduit. The line has the unqualified approval of the Underwriters' Laboratories as being watertight. —ELECTRICAL WEST, May 1, 1932.

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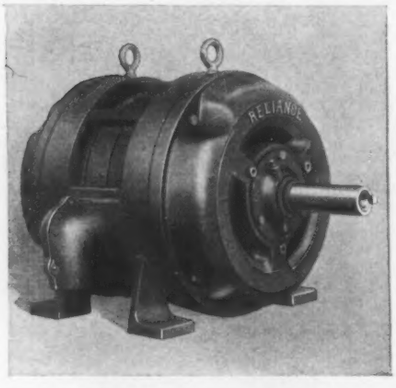

## *Punch Press Motors*

Reliance Electric & Engineering Co., 1088 Ivanhoe Road, Cleveland, Ohio, have developed a line of induction motors especially adapted for punch presses and machinery with similar operating characteristics. These range in size from ¾ hp. to 200 hp.

The chief advantages of these motors are that the installation and operating costs are low and the power factor is considerably improved. A much smaller motor can be used, resulting in power savings which for many applications amount to as much as half that required for ordinary induction motors.

In the design of these motors the flywheel with which all punch presses are equipped was especially considered. During the unproductive part of the operating cycle they will deliver power to the flywheel. When work is being done they slip and permit the fly-wheel to carry the brunt of the load.

These motors develop a starting torque of approximately 225 per cent and have a slip of 8 to 12 per cent. Normal starting current is required. The frame is strong and rigid, being fabricated from bar steel electrically welded. Large conduit outlets are provided which make connecting easy. Furnished with either ball or sleeve bearings and may be obtained either in open, fully-enclosed or fully-enclosed fan-cooled construction.—ELECTRICAL WEST, May 1, 1932.

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## *Poultry Water Warmer*

A new poultry water warmer recently developed by the Rural Electrification Section of the General Electric Co., Schenectady, N. Y., is composed of a heating pad of flexible rubber 3 x 9 in. and 10 ft. of all-rubber cord with rubber plug vulcanized thereto. One pad immersed in an average-size poultry watering pan or trough will keep water free of ice so that a poultry flock will have water available during the winter months. For extremely large containers two or more pads may be used. Rated 30 watts, 115 volts. Retail price, $2.25.—ELECTRICAL WEST, May 1, 1932.

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## *Bathroom Heater*

A new Apex wall insert electric heater that retains all of the features of former Apex models has been introduced by the Apex Mfg. Co., Oakland, Calif., to retail at $12.50 This heater is rated at 1,000 watts, measures 10 in. wide by 12½ in. high and is obtainable in five standard colors.—ELECTRICAL WEST, May 1, 1932.

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## *Lower-Priced Motors*

Conforming to the same basic principle and construction of its De Luxe series, the new Frame No. 400 series of motors developed by Sunlight Electrical Mfg. Co., Warren, Ohio, is priced in line with latest economies of materials and manufacturing. The new motors are made in ⅛, ⅙, ¼ and ⅓-hp., a.c., induction type, 110-volt, 60-cycle, and are regularly furnished with ½-in. shaft.

This new motor when operated on its normal voltage will start a load slightly in excess of twice the full load torque, and the breakdown or pull-out torque is greatly in excess of Power Club ratings, the manufacturer points out. A maximum temperature rise of 40 deg. C. is assured for constant duty at full load conditions. Thus it is at a lower price a standard Sunlight motor and comes with 10 ft. all-rubber Belden cord and plug.—ELECTRICAL WEST, May 1, 1932.

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UNIT MOUNTING OF SINGLE-PHASE DISTRIBUTION TRANSFORMERS, LIGHTNING ARRESTERS AND CUTOUTS—Equipment for the unit mounting of single-phase distribution transformers, lightning arresters and cutouts, for circuits of 4,600/8,320Y volts and below, has been announced by the General Electric Co. Installed on a pole, the equipment requires less space than the conventional cross-arm installation of five separately-mounted devices, and presents a greatly improved appearance. The entire assembly is fastened to the pole with two bolts, dispensing in each installation with two suspension hooks and a cross-arm with its insulators. It provides more secure mounting for the transformer and increased safety for linemen. Time and cost of installation are reduced since all parts are assembled in the storeroom or on the ground, and lifted to the pole as a unit with ordinary block and tackle; no special transformer derrick is needed.—ELECTRICAL WEST, May 1, 1932.

# Trade Literature

¶ WIRING DEVICES CATALOG—Beaver Mfg. Co., Newark, N. J., announces a new complete catalog of its receptacles, cords, sockets, etc. The book has many pages in color and gives suggested re-sale prices. Confidential price sheets for the trade are also offered, and special catalog sheets covering individual specialties of interest at this season.

¶ WIRE ROPE AND WIRE—A Pacific Coast edition of its general catalog has been issued by John A. Roebling's Sons Co., Trenton, N. J. Bound in cloth, in handy pocket size, the book, titled "Roebling Wire Rope and Wire," gives a complete listing of the company's products falling under that head.

¶ PHOTOELECTRIC RECORDER—General Electric Co., Schenectady, N. Y., describes the workings of its new photoelectric recorder for registering any measurable quantity accurately. A partial list of measurements that can be obtained with this instrument includes current in microamperes; voltage in millivolts; frequency in 110ths of a cycle; temperatures up to 1,500 deg. C.; thickness of sheet metal, rubber, paper, etc.; diameter of ball bearings, cylinders, wire, etc.; noise intensity; illumination intensity; vibration intensity.

¶ WATER LEVEL RECORDERS—Bulletin No. 112, describing its boiler water level recorders, has just been published by the Bailey Meter Co., Cleveland, Ohio, for power plant operators and engineers. The booklet explains the method for obtaining records of the true water level throughout the full range of the drum. Illustrations show installation photographs and reproductions of actual chart records.

¶ POWER FACTOR CORRECTION—A simple discussion of the true meaning of power factor and how it can be corrected by static condensers assembled and mounted to meet any requirements, is the purpose of a "Power Factor Correction Bulletin" just issued by the Dubilier Condenser Corp., 4377 Bronx Blvd., New York. The bulletin contains a scale whereby the condenser capacity required for any given power factor correction may instantly be determined.

¶ ACCELERATORS—A new bulletin recently put out by the Monitor Controller Co., Baltimore, Md., explains the manner in which the Monitor accelerator for starting d.c. motors employs electro-magnetic balance to solve motor-starting problems and to produce constant-torque acceleration.

¶ CHROMALOX UNITS—Prices and standard sizes of Chromalox super-speed electric range units for replacement are set forth in Bulletin C-107 now being distributed by the Electric Material Co., Inc., 163 Second St., San Francisco. Sizes required for every make of range are given.

¶ STURTEVANT CATALOGS—Four new catalogs of the B. F. Sturtevant Co., Hyde Park, Boston, describe respectively the company's air conditioning equipment for railway passenger cars, vacuum cleaner tools and attachments, centrifugal compressor and Multivane fans. Catalog No. 388 shows both mechanical and ice storage cooling apparatus; it also features the ductless method of air distribution for both methods of cooling. Attachments for commercial, industrial and heavy-duty cleaning are the subject of catalog No. 387, and catalogs Nos. 386 and 370 give prices and specifications respectively of the company's "Design 9" centrifugal compressors and convertible Multivane fans.

¶ LIGHTING GLASSWARE—Duo-purpose ultra-violet lighting equipment for S-1 and S-2 Mazda sunlight lamps is featured in a new 62-page catalog of commercial lighting glassware and fixtures of the Ivanhoe Division of The Miller Co., Meriden, Conn. Four new lines of indirect lighting units are also illustrated as well as all of the company's standard items.